Leo Stanton Rowe

1871–1946

82

LEO STANTON ROWE

From 1902 to 1930, Leo Stanton Rowe was President of the American Academy of Political and Social Science. On December 5, 1946, his life was suddenly ended by a tragic accident.

Only those of us who had the privilege of working closely with him could fully appreciate what he meant to this organization. For many years the American Academy was a reflection of his ideals of the place such a body as this should occupy not only in our own country, but throughout the entire world. Among his many interests and activities, the Academy took first place until he relinquished his duties as President. Even after that time he constantly advised and aided us. By letter, by telephone, and in frequent long conversations he was always available. He continued throughout to serve on our Board of Directors.

No one knew better than he the complex issues facing modern society. Like others he had a special interest which was expressed for many years through his important contributions to the political life of this hemisphere and for over twenty-five years through his work as Director General of the Pan American Union. But this specialization did not narrow his outlook. To the end he was a wise observer and interpreter of our bewildering world.

Always he was patient and courteous. He was a master of diplomacy in all affairs, both large and small. If he found himself in the minority and was unable to convince the rest of us, he was always ready to accept the decision of the majority. If the responsibility of making a decision rested on him, there was no hesitancy. He was a wise, patient, and at the same time a decisive leader.

If on rare occasions the issues were particularly important, his associates were asked promptly to choose between him and his critics. The facts involved were clearly and simply presented to us. If we had decided against him, there would have been no rancor, no recriminations. He would have instantly stepped aside, leaving the leadership to another.

No main decision against him was ever made. He left Philadelphia in 1917 and in the nearly thirty years since that date served with the Treasury Department, the Department of State and the Pan American Union. For thirteen of those years—until 1930—he was year after year continued as President of the American Academy by the unanimous and enthusiastic choice of your Board of Directors. As time passed he insisted that another choice must be made and finally the Board yielded. But for thirteen years, he had wisely and effectively directed the Academy from his office in Washington.

Leo Stanton Rowe has gone. Like many another great man, he has left thousands of mourning friends. But also his personality has impressed itself on the society of which he was a part This Academy is only one of the institutions which will always be a memorial to him. These few paragraphs are a record of our admiration and of our respect.

ERNEST MINOR PATTERSON

VOLUME 249 JANUARY 1947

THE ANNALS

of The American Academy of Political
and Social Science

Thorsten Sellin, *Editor*
W. Wallace Weaver, *Book Editor*

APRIL 4TH.
1891

SOCIAL IMPLICATIONS OF MODERN SCIENCE

Edited by
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Ann Arbor, Michigan

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PHILADELPHIA
1947

CONTENTS

PAGE
FRONTISPIECE—LEO STANTON ROWE . . . . *preceding title page*
FOREWORD v

TECHNOLOGY AND SOCIETY

RECENT ADVANCE IN THE PHYSICAL SCIENCES . . . . *H. R. Crane* 1
THE ATOMIC CRUSADE AND ITS SOCIAL IMPLICATIONS . . . . *Arthur H. Compton* 9
SOME SOCIAL IMPLICATIONS OF NATURAL RESOURCES . . . . . . *Howard A. Meyerhoff* 20

POLITICAL IMPLICATIONS

THE ATOMIC DILEMMA . . . . *Bernard Brodie* 32
WORLD GOVERNMENT AND THE CONTROL OF ATOMIC ENERGY . . . . *Herbert W. Briggs* 42
CIVIL LIBERTIES IN THE ATOMIC AGE . . . . *Robert E. Cushman* 54
TOTAL WAR AND THE PRESERVATION OF DEMOCRACY . . . . *Arthur W. Bromage* 66

SCIENCE AND SOCIAL CHANGE

PSYCHOLOGY OF SOCIAL CHANGE . . . . *Donald G. Marquis* 75
HOW TECHNOLOGY CHANGES SOCIETY . . . . *William Fielding Ogburn* 81
LAW AND ATOMIC ENERGY . . . . *E. Blythe Stason* 89
SOME ECONOMIC CONSEQUENCES OF SCIENCE . . . . *Sumner H. Slichter* 99

CONJUNCTION OF SOCIAL AND PHYSICAL SCIENCES

THE IMPACT OF SCIENCE ON POPULATION GROWTH . . . . *Warren S. Thompson* 111
NUTRITION . . . . *Howard B. Lewis* 119
THE POLITICAL IMPACT OF MODERN SCIENCE ON PUBLIC HEALTH . *Gaylord W. Anderson* 126
SECONDARY EDUCATION FOR A NEW WORLD . . . . *John W. Studebaker* 135
RESPONSIBILITY OF SOCIAL SCIENCE . . . . *Louis Wirth* 143

THE PROBLEM OF VALUES

SECURITY, FREEDOM, AND MODERN TECHNOLOGY . . . . *William Haber* 152
THE HUMANITIES IN A SCIENTIFIC WORLD . . . . *Hayward Keniston* 160
GOOD, EVIL, AND BEYOND . . . . *George N. Shuster* 169

BOOK DEPARTMENT

ABELE, RUDOLPH VON. *Alexander H. Stephens.* Alphonse B. Miller 196
ALLEN, JAMES S. *World Monopoly and Peace.* Wendell Berge 202
AMERICAN ECONOMIC ASSOCIATION. *Readings in the Theory of Income Distribution.* John F. Cronin 198
ANDERSON, WILLIAM. *The National Government of the United States.* Eugene P. Chase 180
BEARD, CHARLES A. *American Foreign Policy in the Making, 1932–1940.* Denna Frank Fleming 186
BENEDEK, THERESE. *Insight and Personality Adjustment.* James S. Plant 207
BEVERIDGE, SIR WILLIAM. *The Price of Peace.* A. O. Sarkissian 189
BOLLINGER, LYNN L., ALAN PASSEN, and ROBERT E. MCELFRESH. *Terminal Airport Financing and Management.* Gilbert Goodman 202
BRODIE, BERNARD (Ed.). *The Absolute Weapon.* Robert Strausz-Hupé 177
BROWN, FRANCIS J. *Educational Opportunities for Veterans.* Francis G. Cornell 207
BRUNNER, EMIL. *Justice and the Social Order.* Roland L. Warren 211

PAGE

Carr, Edward H. *Nationalism and After.* A. O. Sarkissian 184

Cassirer, Ernst. *The Myth of the State.* Joseph S. Roucek 183

Chamberlain, Lawrence H. *The President, Congress and Legislation.* Charles W. Shull 182

Chambers, M. M. *Opinions on Gains for American Education from Wartime Armed Services Training.* Francis G. Cornell 207

Chatham House Study Group. *British Security.* Paul Knaplund 189

Christensen, A. N., and E. M. Kirkpatrick (Eds.). *Running the Country; An Anthology of American Politics in Action.* Ralph Adams Brown 179

Cramer, Harald. *Mathematical Methods of Statistics.* Bruce D. Mudgett 203

Curti, Merle. *The Roots of American Loyalty.* Horace M. Kallen 208

Eisenhower, Dwight D. *Eisenhower's Own Story of the War.* A. Robert Ginsburgh 185

Finer, Herman. *The United Nations Economic and Social Council.* Denna Frank Fleming 178

Fisher, Harold H. *America and Russia in the World Community.* A. O. Sarkissian 187

Gregory, Charles O. *Labor and the Law.* Joel Seidman 205

Hayes, Carlton J. H. *Wartime Mission in Spain, 1942–1945.* J. Fred Rippy 188

Hazlitt, Henry. *Economics in One Lesson.* Earl R. Sikes 198

Hogan, James. *Election and Representation.* James K. Pollock 194

Loeb, Harold. *Full Production Without War.* Mary van Kleeck 201

Mason, John Brown. *The Danzig Dilemma.* Stefan T. Possony 192

Maxwell, James A. *The Fiscal Impact of Federalism in the United States.* Harold W. Stoke 182

Mendershausen, Horst. *Changes in Income Distribution during the Great Depression.* Henry H. Villard 199

Meriam, Lewis. *Relief and Social Security.* Robert W. Kelso 209

Mockford, Julian (Ed.). *Overseas Reference Book of the Union of South Africa.* Heinrich A. Wieschhoff 190

Nathan, Robert R., Oscar Gass, and Daniel Creamer. *Palestine: Problem and Promise.* John R. Randall 193

Noble, Ransom E. *New Jersey Progressivism Before Wilson.* Kenneth W. Hechler 195

Nock, Albert Jay. *Our Enemy, The State.* George C. S. Benson 184

Northrop, F. S. C. *The Meeting of East and West.* James Burnham 179

Okubo, Miné. *Citizen 13660.* Constantine Panunzio 209

Patterson, William F., and M. H. Hedges. *Educating for Industry.* Francis J. Brown 206

Rider, Fremont. *The Great Dilemma of World Organization.* Clyde Eagleton 178

Roche, Jean de la, and Jean Gottmann. *La Fédération française, contacts et civilisations d'Outre-Mer.* Garland Downum 191

Salter, J. T. (Ed.). *Public Men In and Out of Office.* Peter H. Odegard 195

Smith, Charles Copeland. *The Foreman's Place in Management.* Ludwig Teller 205

Soljak, Philip L. *New Zealand: Pacific Pioneer.* Edmund de S. Brunner 190

Stigler, George J. *The Theory of Price.* Leonard G. Mathy 200

Strode, Josephine (Ed.). *Social Insight Through Short Stories.* Ruth Smalley 210

Swisher, Carl Brent. *The Growth of Constitutional Power in the United States.* Robert J. Harris 181

Tansill, Charles Callan. *The Congressional Career of Thomas Francis Bayard, 1869–1885.* Wilfred E. Binkley 197

Williams, Roger J. *The Human Frontier.* Alfred McClung Lee 211

Womer, Parley Paul. *Citizenship and the New Day.* Frank Paddock 193

INDEX 215

The articles appearing in The Annals are
indexed in the *Readers' Guide to Periodical
Literature* and the *Industrial Arts Index.*

FOREWORD

SCIENTIFIC knowledge has outstripped social understanding. It is generally held that man's knowledge of the physical world exceeds his understanding of human relationships, and that, consequently, he is better prepared to cope with the problems of science and technology than with the forces generated by human associations. The interrelations between the physical and social worlds, if not fully understood, may at least be observed. The experienced observer knows that the impacts of science and technology upon society are inevitable, although sometimes unpredictable. Science may remain neutral in all contests between good and evil, but this vaunted neutrality cannot determine the ends to which science may be directed. Man may dream of the potential good inherent in recent scientific discoveries. Men of evil design will not be deterred by such dreams from attempting to seize power or from employing the forces of modern science for destructive purposes. Only a broad understanding of the social implications of scientific advance and the effective use of political and other social controls can guarantee the constructive and beneficial uses of those forces.

Social organization of the last century provided the opportunities for scientific research and technological progress. As an inevitable consequence of "social lag," man did not reorganize society against the impacts of these advances, and probably could not have done so. Social tensions were eased, however, by a compensating technological lag. In recent years technological progress has outstripped both scientific discovery and social adjustment. Under the impetus of total war these developments were directed toward destructive ends. Science was harnessed by technology for recognized antisocial purposes. Our experiences in the productive, social uses of modern science are extremely limited. Peacetime applications of these forces remain largely unexploited. Thus, the implications of modern science for constructive purposes will raise innumerable social problems in the immediate postwar years.

This is an appropriate time to take stock of scientific and technological advances, to anticipate their social consequences, to appraise their potential values, and to examine proposed changes in social organization designed to accommodate man to the new world of science and, at the same time, to insure him against the dangers inherent in the new forces. In a democratically organized state, social organization and adjustment to change must be preceded by public discussion of the basic issues. Social trends cannot be dictated. They develop in response to pressures and impacts. An understanding of the impelling forces may, however, direct the trends and lend stability to the social order.

The Summer Session of the University of Michigan, in presenting this series of lectures for its students and guests, assumed an educational obligation on the part of colleges and universities to contribute to this understanding of the social implications of modern science. We regret that two excellent lectures: Ralph Barton Perry's lecture, "What Is the Good of Science?" and Dr. Albert C. Furstenberg's, "Recent Advances in Medicine," were not delivered for publication in this series. The University appreciates the generous offer of THE ANNALS to publish the lectures and is grateful for the larger audience thus assured.

HAROLD M. DORR

Recent Advance in the Physical Sciences

By H. R. CRANE

BECAUSE of the sudden impact which science made, on August 6, 1945, upon our political thinking, it has been difficult to maintain the proper perspective on the development that has occurred in science itself in recent years. Progress that could not have been imagined ten years ago has taken place in the application of science to war. But how do we stand in regard to the kind of science that makes for basic technological progress in peacetime?

A major part of man's effort has always been directed toward finding ways of commanding more mechanical power than he is able to produce with his muscles. One might even say that what characterizes a technical civilization more than anything else is the use, by man, of more power than he develops in his muscles. That the degree to which mechanical power is used is a pretty reliable index of the degree to which a civilization is technical, can be demonstrated easily by lining up nations in the order of power expended per capita, or even making the same comparison between states or cities.

As a resident of the United States, your share in all the power developed in the Nation amounts to about 10 horsepower, continuously, day and night, which is at least fifty times the power your body develops. You use nearly half of your share of power in your automobile.

SOURCES OF ENERGY

What are the sources of man's energy? We live in a sea of energy, and yet only a minute fraction of it is in such a form that we know how to make use of it. Coal contains energy received from the sun in times past and captured by means of photosynthesis. The same is true of oil. In using water power we are not using up reserve energy, but are using energy received from the sun currently. This is true also of wind power. Power from the tides is not derived from sunlight either in the past or in the present, but depletes the energy of rotation of the earth. Uranium is a form of leftover energy which, once used, will never be replenished. The energy we obtain through photosynthesis by planting crops is a utilization of the current radiation from the sun.

To show what a relatively small amount of energy we find stored in forms useful to us, it is estimated that the entire coal deposit of the earth could be duplicated if the sunshine falling on the earth for fifteen days could be utilized completely for photosynthesis. All the known oil deposits could be duplicated in a few minutes if the energy of the sunshine could be used completely for that purpose. The newest source of energy, uranium, is widely distributed in the earth's crust, and the total amount of it is very large. However, most of the uranium is contained in deposits of low concentration. If we count just the deposits which were known before the war and which were termed "rich," the amount of energy represented is in the same category as that of the oil deposits. But since the discovery of methods of releasing atomic energy has upset the uranium mining situation economically, it will probably be years before we can again determine the amount of energy on which we can rely. To add to the confusion, new information on the existence of uranium deposits is labeled "Secret."

Packaged energy is sometimes obtained from the sun's radiation through the raising of crops; for instance, when corn is raised and turned into fuel alcohol or when wood is grown for fuel. An idea of the efficiency of capturing energy in this way can be obtained from the fact that a field of corn could be grown during a few hours of one afternoon if all of the sunshine energy falling on the field could be used in photosynthesis. Thus we see that, while the direct radiation from the sun, and also the winds and tides, contain tremendous amounts of energy, we have to let them go by while we exploit relatively minor energy sources, such as the oil deposits, which were left in the earth because of some accidental circumstance of earlier times.

EXPLOITATION OF ENERGY

To give the gist of what I have said, the only sources of energy which are now useful in running the machines of our technology are those which nature has put up for us in small, concentrated packages, and the more concentrated the packages are, the more useful (and violent) are their applications. The potency of atomic energy lies not in the fact that an energy source of greater magnitude than anything else has been made available to us, but it lies solely in the fact that it can be put up in terrificly small and concentrated packages. It seems, then, that our efforts to learn ways of controlling more energy must take two directions: searching for new concentrated sources of energy, and searching for new means of exploiting the more diffuse sources of energy. Success in the latter direction, which will revolutionize our living far more than will atomic energy, will be ours when we learn the trick of artificial photosynthesis; that is, how to make the sun's radiation synthesize our food and fuel for us without the use of plants.

A profound principle of physics and chemistry lies at the root of the question of our exploitation of energy sources. It is the second law of thermodynamics, which states that any change which occurs in a closed system must be in such a direction that energy is transformed from a more available to a less available form. In layman's language, this means that all the energy in the universe that exists in concentrated packages is gradually being spread out thinly over the whole universe, and that this is definitely a one-way process. This principle has thus far stood the test of all experimentation. If we follow it to its logical conclusion, it will tell us, of course, that there is no way in which the universe can repeat the performance. We are not concerned in this article with repeat performances, but I bring in the argument to indicate that as we release, irretrievably, the energy from our concentrated sources (uranium, for instance), we are going in the direction in which the whole universe is going, and in the only direction which is possible.

NUCLEAR CHANGES VERSUS CHEMICAL CHANGES

Nuclear physics, the branch of science which has occupied the center of the stage for the last decade or more, is concerned with the transformation of one element into another. Eighty-one permanent elements are found in the earth. Including those which decay radioactively, there are 90 known elements.[1] All materials we deal with are either these elements or chemical combinations of them, and all chemical reactions are merely the rearrangement of these combinations, without any change in the elements themselves; as, for example, the burning of methane gas in oxygen. Methane is a combination of carbon and hydrogen. This combination is destroyed and two new combinations are formed—carbon with oxygen and hydrogen with oxygen. Exactly the same amounts of the elements carbon, hydrogen, and oxygen will be found at the end of the process as at the beginning, although in different combinations. The most noticeable result of this rearrangement is the liberation of a considerable amount of heat energy.

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[1] The atomic number of the heaviest element, uranium, is 92, but since two elements, No. 43 and No. 61, are missing, the total number found is 90.

Nuclear reactions differ from the above process in that the amount of a given element is *not* the same before and after the reaction. Rearrangements and new combinations are made of the material which comprises the nuclei of the atoms of the elements. An example is the reaction between the nuclei of hydrogen and lithium, producing helium.

$$H^1 + Li^7 \rightarrow 2He^4$$

Some nuclear reactions give off energy and some will occur only when energy is supplied, but the amount of energy involved is approximately a million times greater than the amount involved in chemical reactions. To consider the two examples given, the reaction between hydrogen and lithium gives off about a million times as much energy per molecule as does the burning of methane.

Just as in ordinary chemistry, if one wishes to obtain energy by a reaction, he must select a reaction which liberates a lot of energy, which, generally speaking, will be the transformation of less stable compounds into more stable ones. In nuclear physics we have a diagram called the packing fraction curve, which represents the stability of nuclei on a relative scale. This is shown in Figure 1. The lower a nucleus lies on this diagram, the more stable it is; so, generally speaking, if we make a reaction which starts with nuclei at either end of the scale and ends with nuclei nearer the middle, there will be a release of energy. Now the reactions which give the energy of the atomic bomb go from the extreme right-hand side of the diagram toward the left, and those which produce the energy of the sun go from the left-hand end toward the right. In the newspaper stories which followed the dropping of the atomic bomb, it was said that we had tapped the energy source used by the sun. This is true in so far as both are nuclear processes, but there are radical differences from the nuclear physics point of view. I want now to discuss both of these processes.

PRODUCTION OF ENERGY BY THE SUN

From more than a hundred years ago up to a decade ago, astronomers were puzzled as to how the sun was able to pour out energy at so great a rate over so long a period of time. To measure the rate of energy output of the sun, it was necessary only to measure the heat and light falling on a square foot of the earth's surface and then with the aid of geometry and arithmetic find the total. A minimum for the length of time over which this rate must have been maintained could be estimated reliably from the fossils and rocks found on the earth. These two figures, the rate and the length of time, gave a value for the total energy radiated which could not be accounted for or even imagined on the basis of the then known physics and chemistry of matter.

When, in 1930, physicists began to produce some nuclear reactions among the light elements by artificial means, astronomers instantly recognized that herein lay the answer to the paradox of the energy output of the sun. Many schemes were proposed, but the major contribution was made by Professor H. A. Bethe of Cornell University in 1939, who gave a detailed solution in terms of the synthesis of helium out of hydrogen by the catalyst carbon.

The reaction which it is believed is responsible for the generation of power

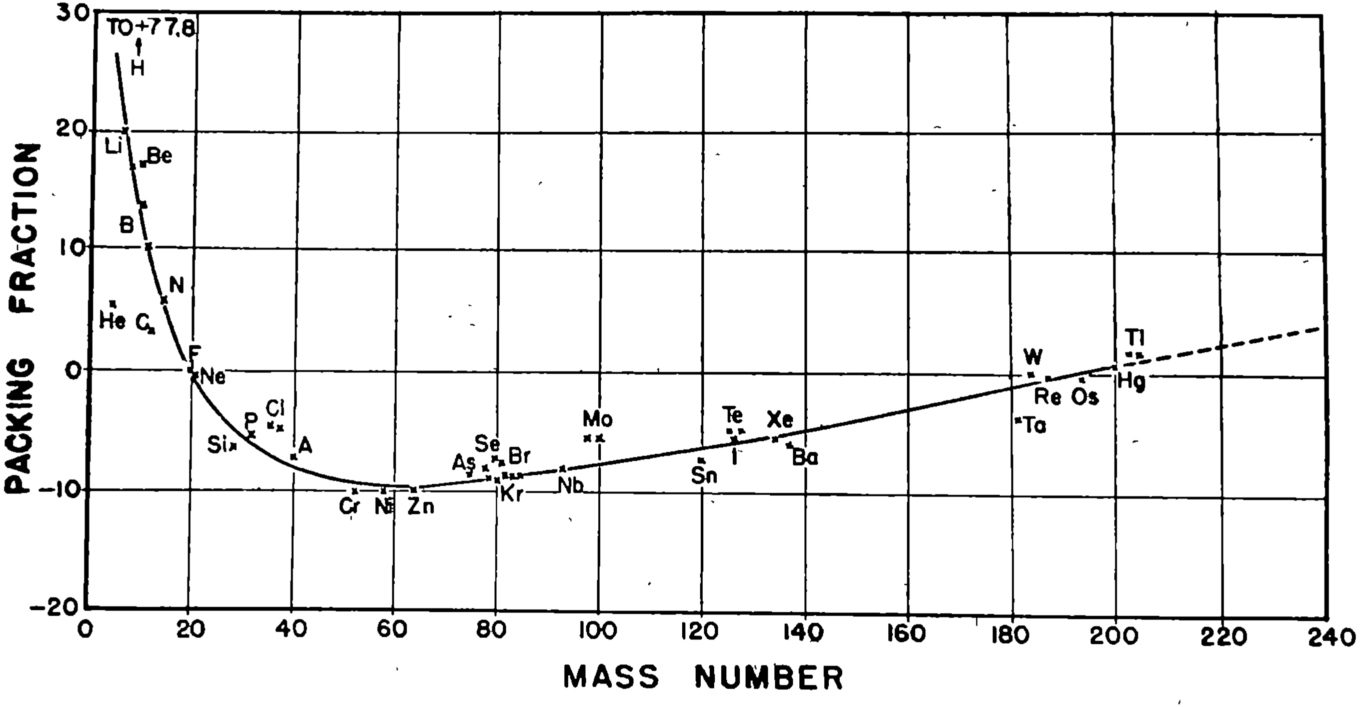

FIG. 1. Packing fractions for the elements

in the sun can be written briefly as

4 hydrogen + carbon → helium + carbon

The carbon is changed during the process but comes out unchanged at the end. There is only a small amount of carbon in the sun, but this goes round and round in the cyclical reaction and can serve to catalyze the formation of an unlimited amount of helium out of hydrogen. For every gram of hydrogen that is "burned" into helium, a tremendous amount of heat energy is given off—as much as by the burning of twenty-five tons of coal. The reaction process in detail is

$$\begin{array}{ll} & C^{12} + H^1 \rightarrow N^{13} + \gamma \\ & N^{13} \rightarrow C^{13} + e^+ \\ & C^{13} + H^1 \rightarrow N^{14} + \gamma \\ & N^{14} + H^1 \rightarrow O^{15} + \gamma \\ & O^{15} \rightarrow N^{15} + e^+ \\ & N^{15} + H^1 \rightarrow C^{12} + He^4 \\ \hline \text{Net:} & 4H^1 \rightarrow He^4 \end{array}$$

I give this in detail because I want to emphasize the fact that the process is a sequence of reactions, each one of which depends on the product of the previous one. In such an interdependent sequence, there are many possibilities for self-limitation of the rate; that is, there are possible ways in which it can proceed nonexplosively, and such, in fact, we know must be the case. Although all the individual reactions have steep temperature coefficients, the whole system cooks along at about 20,000,000 degrees centigrade, and seems to be stable. The reactions I have written down are not the only reactions taking place in the sun; there are many that are incidental to the main reaction. As an example of how stabilization might be accomplished, we may imagine that when the temperature begins to rise above 20,000,000 degrees, one of the incidental reactions begins to occur and robs the carbon sequence of one of its reactants, thus putting a damper on any further rise in temperature.

One may be tempted to ask why this set of reactions cannot be made to go on the earth, as a source of power, since all the ingredients required are common elements. While the sun turns out a terrific amount of power, the reacting core of the sun is like a very large, *very slow-burning* fire. If we could maintain a few cubic miles of a mixture of carbon and hydrogen at 20,000,000 degrees, we should have a practically inexhaustible power plant: but clearly this cannot be done. The power produced by the reaction is sufficient to maintain the reacting material at the required temperature against losses by radiation, only if the amount of material is very large, that is, about as large as the sun. No promising scheme has yet been proposed by which we might derive power from nuclear reactions of the light elements, and from our present knowledge of nuclear physics, the possibility seems remote.

ENERGY FROM URANIUM

We shift now to the right-hand end of the diagram of the elements, and consider the fission of uranium. To understand this, we shall have to discuss briefly the role that the neutron plays in nuclear reactions. The neutron is a particle of about the same weight as a hydrogen nucleus and carries no electrical charge. It is one of the constituents of the nuclei of all elements except hydrogen. It has an extremely great tendency to react with nuclei with which it comes into contact, and for this reason we do not find the neutron in a free state outside of nuclei. Neutrons are produced abundantly as a result of many nuclear reactions, but their free existence is brief because of their great reactivity.

What makes a chain reaction possible in a lump of uranium 235 is the fact that when a neutron strikes the nucleus U^{235} it not only causes the nucleus to split into two roughly equal pieces, but it causes a few extra neutrons to be set free as fragments of the disintegration.[2] The few extra neutrons set free in turn produce fission or splitting in other U^{235} nuclei, and if nothing happens to stop the spread of this chain process, all the nuclei in the chunk of uranium will be split. The energy which is released in the fission and which appears as heat is, as you know, tremendous, and such a release of energy is consistent with the fact that the products of fission lie at approximately the lowest point in the packing fraction curve, to which I have already referred.

Fortunately, perhaps, for us, there are many influences which prevent uranium 235 from chain reacting under any but very special circumstances. The first is the presence, in all natural uranium, of another species, or isotope, uranium 238. This is present to the extent of 99.3 per cent; that is, only 0.7 per cent of the mixture is the fissionable U^{235}. Uranium 238 consumes neutrons, but in so doing it does not split and produce fresh neutrons. Before a chain reaction can occur in a lump of uranium, the isotope 238 has to be removed, or at least reduced in quantity. Since both of the isotopes are uranium and therefore behave the same chemically, the job of separation is a formidable one. The size of the plant at Oak Ridge, Tennessee, which was built to do this job, gives an idea as to the magnitude of the task.

A second influence which works against the chain reaction is the loss of neutrons from the surface of the lump of uranium. If the lump is small, the surface loss is so great in comparison to the rate of production of neutrons that the chain reaction dies out instead of growing. Thus for every value of the concentration of U^{235} in the mixture there is a critical size, such that in a lump larger than that size the chain reaction will grow explosively, and in a lump smaller than that size the chain reaction will die out. This is exactly the way in which an atomic bomb is controlled: two lumps, individually smaller than the critical size, are quickly put together and the result is an explosive growth of the chain reaction.

A uranium chain reaction having entirely different behavior from the one I have just described can be made to take place if many tons of natural uranium (0.7 per cent U^{235} and 99.3 per cent U^{238}) are arranged in a lattice with slabs of carbon. This is called a "pile" and is a "slow-burning" chain reactor. Without going into the details, it can be said that the carbon that is interspersed with the uranium cheats the isotope 238 out of its chance to consume the neutrons, and makes a slow, controllable reaction possible without the necessity of going through the costly process of removing the isotope 238. The same amount of heat energy is liberated in the burning of uranium in the pile as in the bomb, but it is liberated under controllable conditions. When atomic energy is used for power for cities, it will be obtained from piles.

Of the many new isotopes that are synthesized within a pile when it is reacting, one, plutonium, is as capable of undergoing an explosive chain reaction as uranium 235 is. During the war, the huge Hanford Pile, in the state of Washington, was devoted to the synthesis of plutonium for use in atomic bombs. It is apparent, then, that we possess two distinct methods of making explosive material for bombs, and, if one can judge by the fact that the plants using both methods are still very much in the news, neither method is radically better than the other.

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[2] For more complete information on chain reactions and on the atomic bomb, the reader is referred to H. D. Smyth, *Atomic Energy for Military Purposes,* Princeton, N. J.: Princeton University Press, 1945.

FUTURE ENERGY SOURCES

I should like to touch briefly upon the direction in which we seem to be going in the physical sciences. The possibility of using atomic energy in peacetime is justly hailed as a blessing, but one must remember that the amount of energy to be obtained, at least by the process which we now know to be practical, may always remain small compared to that which we obtain from coal. It is not hard to argue that this is poor compensation for the headache that atomic energy has given us. To me, a more important use of the chain-reacting pile lies in the synthesis of new isotopes in heretofore unimagined quantities, many of them radioactive, which can be used for important experiments in nearly all branches of science and in medical treatments.

While this use of the uranium pile is of a long-range type, I feel certain that the results in knowledge gained will in the end far outweigh the benefits brought about by the power developed by the pile. To give but one instance out of hundreds, it has been known for some years that radioactive phosphorus is highly effective in the treatment of leukemia, a disease in which there is an uncontrolled increase in the number of white blood corpuscles. Radiophosphorus, administered by mouth in a solution, goes preferentially to the leukemic tissue where it interferes with the further production of the white corpuscles. So far radiophosphorus has been obtained only in minute quantities from the cyclotron, but now it can be produced in practically unlimited quantities from the uranium pile, and this source of supply has recently been made available to the public.

A question that surely is at the back of everyone's mind concerns the prospect of our being able to make the more common elements chain react. The situation can be pretty well summed up as follows: Chain reactions involving the elements at the top of the atomic scale (uranium and its close neighbors) have already been thoroughly explored, and it can safely be said that we know pretty well where we stand both as to present and future possibilities. The elements in the middle of the atomic scale may be passed over, because, as we saw from the packing fraction curve, they are too stable to offer any possibility of giving up energy. This leaves the low end of the atomic scale. I have discussed the conditions under which the elements at the low end of the atomic scale are able to react to produce energy in the sun, and it is clear that nothing resembling these conditions can be created on earth. To make the light elements react, we shall at least have to make an attack from an entirely new direction, for it cannot be done by the application of what we now know.

Shortly after V-J Day a scientist in one of the large physics laboratories in this country thought he had seen evidence of an unaccountable release of energy from the hydrogen nucleus. Immediately the government padlock of secrecy was clamped onto the door of the laboratory. It was soon removed, because the scientific evidence turned out to be a false alarm. I believe that since the time of this incident both scientists and government officials have become less excitable as to what the near future holds for us in respect to radically new sources of energy. What may result from decades more of fundamental science and expensive development cannot be imagined, but it can be said that uranium and its near relatives constitute a unique and highly accidental energy source, and that the technical methods of releasing energy from uranium cannot simply be extended to include other, and more common, elements.

A possibility for a development in the

release of energy that is not remote, and which is sobering indeed, is the following. The separation of U^{235} from U^{238} in the quantity necessary for a bomb at present requires a very large-scale industrial plant. However, gradual progress in the methods for separation of isotopes is being made. What if, instead of slow progress, a really big jump were to be made? What do you imagine that you, Mr. Reader, would do if you were a chemist or a physicist, and you made a discovery or got an idea which would enable you (and your enemies) to perform the separation of U^{235} from U^{238} in your garage or basement?

CONCLUSION

In conclusion I want to say something about the change in the method of going about research which has occurred in the last twenty, and especially in the last six, years. Research has joined the ranks of big business. Experiments in the frontier problems of physics nowadays require the use of apparatus costing a hundred thousand to a million dollars. Part of this arises, without doubt, from the nature of the problems that have to be solved. But an equally important reason, I believe, is the fact that we have come to realize that it pays a nation to push its development in fundamental science on at least as great a financial scale as it pays to push, say, the development of next year's automobile models. I have asked myself this question: Would any given group of scientists, twenty years ago, have known how to spend a million dollars effectively instead of ten thousand dollars? I am inclined to think that they would have, after recovering from the initial shock; and if this supposition is true, it indicates that the present accelerated pace of science is due as much to our changed appraisal of its value as to the change in the nature of the problems.

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The Atomic Crusade and Its Social Implications

By Arthur H. Compton

MUCH has been said regarding the implications of atomic energy. It is worth calling special attention to the unusual sequence of events that led to making atomic energy useful and which has made a group of scientists become a significant factor in our political and social life. This sequence of events is indeed a social movement, motivated primarily not by considerations of economic and political power, but by social objectives and ideals. For this reason the correct connotations are given by characterizing the movement of which the atomic bomb was an incident as "the atomic crusade."

In considering the social implications of this atomic crusade, it is important to note why it was possible for the movement to develop and succeed in its wartime objectives in the United States, while it was not similarly successful elsewhere. This will lead us into a consideration of its form of organization and of the factors favorable to its strength. What are the future implications of such features as the highly organized research, the close co-operation of science, industry, and government, and the imposition of secrecy on research that is traditionally free? But perhaps of greatest interest is the way in which the atomic crusade epitomizes certain major social trends, such as growing specialization with its implied co-ordinated co-operation, increasing emphasis on better training and education, and the growing awareness of the need for generally accepted social objectives as co-ordinating principles in setting a pattern for our social and political development.

The dramatic use of the atomic bomb on Hiroshima was unique with regard both to the startling newness of the weapon and to its decisive effectiveness. Perhaps the bomb merely gave the Japanese a convenient excuse for resigning from a struggle which their leaders already knew was lost. Nevertheless, it changed literally at a flash the world's attitude toward war. Our enemies had not overlooked the possibility of an atomic bomb. In fact, their progress in this direction was the spur that goaded us into its development. Their own wartime investigations had, however, convinced them that the construction of such a weapon could not actually be accomplished. In our own country the atomic bomb was one of the last major developments of war research to be undertaken. It was conceived as a practical undertaking only after other urgent war tasks had made heavy demands on the Nation's major scientific talent. Thus it was the more remarkable that so complex an undertaking should have been carried to a decisive conclusion so quietly and in so short a time.

Faith in the Goal

The atomic program was in fact a crusade. This is why it was so effective. It was not necessary to have a highly refined organization to get co-operation. The goal was recognized as so important that personally favored ideas were willingly scrapped when it became clear that better progress could be made by working along other lines. Individual scientists, leaders of the Government, the Army, universities, and great industrial organizations successively caught the vision of great achievement. They could see that success might spell early victory and that to lose the race might well mean defeat. They were glad for a chance to share in what was instinctively recognized as one of the great human adventures of all time.

Many have wondered how the secret was so well kept that both our enemies and the American public were taken completely by surprise. Probably some thousands of persons—a per cent or so of the million who worked on the job—knew, or guessed, that atomic bombs were being prepared. Though very few were acquainted with such essential details as delivery schedules, objectives, and timing, the vigor of the prosecution of the work showed that the use of the bombs in this war was expected. Of course, care was used in selecting those who would have to know the purpose of what they were doing. But the real explanation for the tightness of the secrecy was that when by accident someone learned what was going on, he was awed by its significance. A simple suggestion was enough to make him understand that "here is something I must not tell. The safety of the world may depend on the tightness of my lips." He had himself become a part of the crusade.

As in the case of a holy war, so also the atomic crusade was the expression of a widespread faith that had developed over many years. Among the scientists this was a faith in the reliability of their methods of prediction, a confidence in their ability to accomplish a task that theory showed was possible, combined with a conviction that the release of atomic energy would eventually become one of the greatest gifts that science could ever provide to man. Generations of experience with the growing applications of science gave the representatives of government and industry a faith in the considered judgment of scientists. Other marvels as great as this had appeared. All those in responsible positions were determined to avoid any chance of losing the fight for freedom. If for no other reason than that they might be right, the predictions of the scientists must be listened to. Faith, expressed in complete support, was called for.

ATOMIC POWER IN PEACE

It would be a mistake to suppose that either the scientists or the Government set out initially to build an atomic bomb. This was indeed the central military objective of the great atomic war effort. The bomb was, however, only the wartime aspect of a much greater vision. This vision began to take shape with the discovery fifty years ago that within the atom lies a storehouse filled with energy vaster by far than that which shows itself in such chemical processes as the burning of coal. Many a physicist in his heart of hearts hoped that he might have a share in presenting this wealth of energy in useful form as a Promethean gift to mankind. Perhaps nothing that physics could ever do would be of so great practical importance. Dreams were dreamed of a more abundant life, of greater knowledge to control disease, of greater freedom to build a better world. When uranium fission was discovered, it seemed that these dreams might be made real. Atomic power to drive the wheels of industry? Yes, and to propel ships over the seas and supply heat in the arctic wilds, making more of the planet available to man.

But uranium fission came at a time when war, the defense of all that was dear, compelled everyone's attention. The possibility of atomic explosions had been thought of only as terrors to be avoided, disasters that might overcome the bold experimenters who first would start the atomic chain reaction. Could atomic engines win the war? Hardly. By the time they were developed in usable form the war should be over. Nor would the use of such engines be of decisive importance. But the sudden release of atomic energy might make a bomb that would give to its user an enormous advantage. When this advantage was clearly seen, fear lest the enemy might first build such weapons called for a great effort. The atomic war program quickly took shape and into it was thrown all the strength that could be spared from other vital tasks.

To those who had been working with atoms for years, however, even the winning of the war was only one step in the use of the new-found strength. Victory was necessary so that people should be free to work for a better world. Among the essential features of that better world stands prominently the freedom from fear of war. The atomists knew that from here on, war would be so destructive that its waging would be madness. The world must see that this is true and be compelled to find a way whereby war can be prevented. With this as a greater objective, the years they spent at making atomic bombs prepared those who were making them to burst into a vast missionary call for peace as soon as the war was won. The little group of atomic physicists had now grown to a crusading army, with the strength of the many thousands of humanity-minded men and women who had shared their war effort.

Nor is peace itself the final goal. Many have been the frustrations of science. Improved methods of supplying food and shelter and other essentials to needy humanity have failed to achieve their promise because of the failure of society to use them for the common welfare. Here in atomic energy is a new, great opportunity to enrich life. Those who have brought this new child of science into being are determined that they shall not be frustrated again. It is not the rich, not the clever or the powerful, not the United States, Canada, or Britain alone that shall prosper from this new gift. The whole world shall have peace and, as far as the new advances of science and technology can bring it, prosperity and a more complete life. It is this great goal that the atomists hold before them. Atomic energy gives perhaps the greatest opportunity they will ever have to work effectively toward that goal. This opportunity must be used to the utmost. Such is the spirit of the atomic crusade.

MOBILIZATION OF THE ATOMIC BOMB PROJECT

In his official report on the use of atomic energy in war, Professor H. D. Smyth has given an authentic account of the way in which the atomic program was organized. For the purpose of this article it will be useful for me only to call attention to certain distinctive features of that organization.

It was the civilian scientists actually engaged on studies of atomic fission who first called attention to its potential importance in war. Previous to the discovery of the fission of uranium, the hopes for releasing atomic energy were so vague that no one considered seriously the possibility of making it useful in a practical way except after long-continued fundamental research. Such research was indeed progressing, but without any of the urgency associated with war or even with imminent peacetime applications. With the discovery of the fission of uranium, however, physicists throughout the world looked for rapid developments. When in the spring of 1939 reports from Europe and America showed that this fission was accompanied by the emission of more than one neutron per disintegrating atom, the physics world was aware that an atomic chain reaction was possible. How it could best be achieved and how it could most effectively be used had yet to be explored.

Atomic power, radioactivity in abundance, and bombs were thought of and discussed in all quarters of the globe. Those whose interests lay solely in pure physics thought of atomic fission as just one more property of matter that needed exploration. But those who were alert to war developments took quick action. In Germany the resources of the Kaiser Wilhelm Institute at Berlin were turned to isotope separation with an eye alert to possible use for a chain reaction. In the United States the Government was persuaded to give modest support to the enterprise while its objectives were as yet vague. But until 1941 the primary initiative in this country continued to come from civilian scientists and the universities. To the physicists of Columbia University, Princeton, and the University of California goes the chief credit during these early years for proceeding with this vital program as far as limited support made possible, while a study was being made as to what military applications of the energy might be developed.

These early explorations were conducted almost wholly by civilians, under the cover of a secrecy initiated and imposed by the scientists themselves. Their work showed that U^{235} might be concentrated by gaseous diffusion, that plutonium could be made which would be similar in properties to U^{235}, and that with a suitable combination of uranium and graphite it might be possible to make an atomic chain reaction. Until the summer of 1941 no serious attempt had been made in this country to see how such a chain reaction might be made effective in the war, and lacking such an objective, government interest in the program was casual.

The Government sponsors atomic research

Then came the report from England that her physicists had calculated that a bomb of enormous destructive power could be made from a surprisingly small amount of U^{235}. Our data supported theirs, and indicated further that the U^{235} could be separated by any one of several processes that looked industrially feasible. A reviewing committee, appointed by the President of the National Academy of Sciences at the request of the Office of Scientific Research and Development, reported favorably on the feasibility of making atomic bombs of U^{235} that might be decisive in the war, and gave a rough but reliable estimate of the time and the cost required to make the bombs. It was on the basis of this report and of a similar recommendation from the British that President Roosevelt authorized Vannevar Bush, as director of the Office of Scientific Research and Development, to proceed with full vigor with what experiments were needed to see whether the proposed atomic program was indeed practicable. This order, which became effective just before Pearl Harbor, was the start of the atomic development as an active war project.

Vannevar Bush asked James Conant to see that the program was organized and carried through. Conant appointed an executive committee of six persons, of whom three were assigned responsibility for carrying through major divisions of the bomb development task. Of these three, Harold Urey at Columbia University centered his work on the diffusion process for separating U^{235}. Ernest Lawrence at the University of California at Berkeley undertook to try the magnetic separation of the isotopes. I had the joint task of designing the bomb and developing a method for making plutonium. This work was organized at the University of Chicago.

A major handicap faced by the atomic program was the fact that other tasks were already in hand which had scoured the country for competent research men. The radar and electronics studies, antisubmarine research, and the ordnance laboratories had taken the first choice of men with the needed qualifications. The atomic program was fortunate, however, in two ways. First, a considerable nucleus of the leaders in atomic research had not left the field, and rallied to the newly established centers. And second, the previous laboratories had drawn chiefly from the Atlantic and Pacific coasts and had not exhausted the extensive research talent from the middle of the country.

Industry as well as science had to be recruited. With evidence of government interest, this industrial support was gratifying. Consider for example the case of Company "A," which was uniquely qualified to carry through a new and difficult process that had been developed in the laboratory. Speed was of the essence. The task would demand a considerable part of the company's total strength at a time when it was already heavily loaded with important jobs. One morning the need was described to the head of the company. That afternoon the engineers started with the work. The day after the delivery of the first order was completed, well ahead of schedule, the contract was signed determining the price and other details. Company "A" had become a part of the crusade.

After six months of intensive effort, the scientists had gained further confidence in the feasibility of a bomb using either U^{235} or plutonium. Hopeful progress had been made toward separating U^{235}. The evidence was convincing that a pile of uranium and graphite could be built that would give a chain reaction and supply a source of plutonium.

When President Roosevelt was presented with these findings by Vannevar Bush, he set aside the needed funds and instructed the War Department to do whatever was necessary to build atomic bombs. To General Leslie Groves and Colonel (now General) K. D. Nichols of the Corps of Engineers was assigned the responsibility for putting the President's order into effect.

Army, industry, universities co-operate

It was necessary for General Groves to determine which of the various methods for producing U^{235} or plutonium should be put on a production basis, the scale of the production program, how this production should be carried out, and under what conditions the bombs should be built. He made these decisions with advice from a series of reviewing committees composed of highly qualified scientists and engineers who in turn discussed the problems with the research men who were engaged in the development of the processes. His major decisions were in turn reviewed by a Military Policy Committee (Bush, Conant, General Styer, and Admiral Purnell). Messrs. James Conant, R. C. Tolman, W. K. Lewis, and C. A. Thomas acted as frequent consultants to him on technical aspects of these problems, though a large part of his advice came directly from the leaders of the various development projects.

Because of the short time available, the policy adopted was that of proceeding immediately with the building of production plants which, if all went as hoped for, would make available at the earliest possible moment enough atomic weapons to be of decisive military value. For the sake of speed and sureness, three methods of separating U^{235} were carried through to production. While only one method of producing plutonium was completed, alternative methods were under development until the chosen process looked certain of success. Placing the bomb production unit in a completely isolated area, under the direction of a theoretical physicist who in spite of his evident competence was untried in such a major administrative task, was one of General Groves's many major decisions which, if wrong, might have meant the failure of the enterprise.

In order to secure the full co-operation of industry, General Groves chose the du Pont Company as a leader, and requested this organization to undertake the construction and operation of the plant for producing plutonium. Representatives of the company were given full opportunity to study the state of development of all aspects of the bomb program.

After two months of such study, in a meeting at Wilmington, a vice president of the company officially told General Groves that if the Army insisted, the du Pont Company would proceed with constructing and operating the plutonium plant, but that he must state that in the judgment of the company the chance was not greater than one in one hundred that useful results would come from the work during World War II. The vice president explained that as yet (November 1942) no laboratory demonstration of a chain reaction had been made, and no laboratory process for separation of plutonium had been developed. To assume the establishment of such unknown processes on a production basis before the war would be over seemed quite unrealistic. Fortunately, within two weeks the chain reaction was operating in the laboratory, the reviewing committee brought in a favorable report, and the du Pont Company, at the Army's urgent request, undertook the contract, devoting to it the best talent in its organization.

Other major industrial organizations were similarly brought into the enterprise. Sometimes parts of the task looked almost hopelessly difficult. Occasionally one of the operating companies or one of the leaders of the scientific program would become discouraged about an essential part of the work. General Groves and Colonel Nichols, however, never faltered in their determination to carry through.

From the beginning of the task, the universities had been taking an active part. Now they were asked to undertake new burdens. Especially at Chicago, California, and Columbia the undertaking assumed proportions comparable with or greater than all the rest of the universities' activities. It was not obvious that the type of work to be done was appropriate to a university. Nevertheless, here were corporations that were prepared to operate the new mushroom research organizations. In the emergency the heads of these institutions felt that they must help if they were needed. As one spokesman said, "We will turn our university inside out if necessary for winning this war."

Thus the army, American industry, and the universities joined the atomic crusade.

Decision on use of bomb

As the time approached when the bombs would be complete, fateful decisions were necessary. Though the atomic program was initially stimulated by fear of Germany, the European war was now drawing to a close. In planning for the use of the bombs against Japan, President Truman acted on the advice of a civilian committee of highest level. Originally the program of developing and building the bombs had been authorized by President Roosevelt, in consultation with Vice President Wallace, Secretary of War Stimson, Chief of Staff General Marshall, Vannevar Bush, and James Conant. As the work proceeded and large expenditures were required, members of the Military Affairs Committee and a few others were informed as to plans, progress, and intentions.

Shortly after the death of President Roosevelt, President Truman appointed a civilian Interim Committee to advise him regarding the atomic program. The Secretary of War was chairman of this committee, with George L. Harrison as his alternate. Other members were

James F. Byrnes, now Secretary of State; Ralph A. Bard, former Under Secretary of the Navy; William L. Clayton, Assistant Secretary of State; Vannevar Bush, James B. Conant, and Karl T. Compton. Advisers to this committee were General Marshall, General Groves, and a "Scientific Panel" consisting of Ernest Lawrence, Enrico Fermi, Robert Oppenheimer, and Arthur Compton. The use of the bombs by the Army was ordered by President Truman, closely in accord with the recommendations of this Interim Committee. The Committee likewise outlined the broad policies for the further development of the possibilities of atomic energy. Their policies continued to serve as the Government's guide until Congress enacted new legislation.

STRENGTH AND WEAKNESS OF RESEARCH ORGANIZATION

The atomic program is an excellent example of the usefulness of both free and organized research. That the possibility of releasing atomic energy was discovered is a triumph of free research. That this possibility was so quickly applied is a phenomenal achievement of organized research.

The Nazis introduced the distinction between "German" and "Jewish" science. "German" science was that which was distinctively capable of advancing the relative strength of the German Nation. "Jewish" science was that which was of value only for general understanding, or of general human benefit. Science of the former type was practical; of the latter, theoretical or broadly basic in its interest. It was partly because of Nazi scorn of such basic science that many students of science left Germany for countries such as Britain and America where they might pursue their studies with freedom.

Nuclear physics, whose growth has made atomic power available, is a combination of the studies of atomic structure, the theory of relativity, and the quantum theory. None of these was considered by the Nazis to be "German" science. Uranium fission was discovered in a German laboratory, the Kaiser Wilhelm Institute, which was almost unique in continuing the support of fundamental science. In the United States, however, scientists remained free to work in whatever fields seemed to them of greatest value. Our universities, in fact, encouraged whatever studies might aid in the understanding of the physical world. Because of the high value that they place on freedom of thought, our scientists, especially those of foreign origin, were doubly eager to work with their full strength for the survival of our Nation. It is thus fair to say that the strength that comes because of freedom was a vital factor in enabling the United States to initiate and carry through its atomic crusade. At the same time, co-operation in research was called for to an unprecedented extent. How was such co-operation possible in a country where freedom of effort was so highly valued?

A part of the answer is to be found in the spontaneous growth of our voluntarily organized research programs. The centers where the atomic research program developed most productively were those such as at Berkeley and Chicago where there already existed strong nuclei of scientists who had come together voluntarily because by co-operative effort they could work more effectively on their chosen tasks of nuclear physics or cosmic rays. The atomic laboratories were merely greatly expanded organizations of the type which had already become a pattern for modern science—voluntary research teams, the members of each team following willingly the plan set by its captain.

It is important to note that these war research teams were also composed of volunteers. They came together not because of orders, but because they saw that only by such co-operative effort could they do the job that they felt was so urgent. While this might have resulted in weakness because of poor coordination of effort, it turned out to be a source of strength.

General Groves once complained that these scientists were undisciplined: "They do not know how to take orders or give orders." It was explained to him that they had instead a different kind of discipline. The scientist is essentially an initiator. It is his function to find out for himself what needs to be done and to exert the self-discipline required to do it without instructions from anyone.

The technique of directing the activities of such a group of self-starters so that their work will be effectively coordinated toward a single goal is very different from that of commanding an army or bossing a crew of laborers. Instead of telling a man what his job is and how he should do it, the research man needs first of all to know what the objective of his task is, why it is important, and what the interests and abilities of his collaborators are. Then he can intelligently choose for himself where he can best contribute to the program. It takes more effort thus to keep a program oriented; but having chosen his task, the scientist assumes a responsibility and an enthusiasm for its accomplishment which are not to be found among those who work merely under orders.

An important but rarely mentioned feature of the war research organizations was the frequent staff discussions of technical and policy problems. When the plutonium project was at its height, such meetings were held regularly twice a month, usually at Chicago, but occasionally at Oak Ridge or elsewhere. A hundred or more persons would attend with representatives from the scores of widely distributed centers at which collaborative work was going on. Papers were read, some dealing with the progress on important problems, and some with technical or scientific information that had been found. At the policy meetings, with attendance limited to some thirty heads of laboratories or divisions, the state of the atomic program was regularly reviewed and plans for the future were discussed. While at all of these meetings representatives of the Army were present, the notable fact was the freedom and thoroughness with which all the relevant problems were considered. Perhaps more than any other aspect of the organization, it was these regularly scheduled general discussions, combined with frequent group discussions at each major center, that kept the work progressing on the direct road to success.

Difficulties under Army control

When the atomic program was transferred to the Army's shoulders, there were many discussions as to the advisability of inducting many or all of those engaged in it into the Army, so that they might work under military directives. Such action would, I believe, have made it enormously more difficult to maintain the freedom necessary for effective progress. Even without such direct militarization, the evident need for concentration on the direct line of attack to solve the problems promptly led to much more regimentation than would ordinarily have been acceptable over so long a time to research men. By keeping the top direction in the hands of men who were themselves familiar with research, however, it was possible to maintain a highly co-ordinated program without coercion and with persistently high morale.

The difficulty of organizing such a research program within the Army's accustomed secrecy rules, however, amounted practically to an impossibility. Prominent among the military principles of secrecy is that of compartmentalization. No one must know anything that is not necessary for performing his own task. If, however, one is to choose his task and take the responsibility for performing it so as to give the results needed by others, one's view of the over-all effort must extend well beyond his own immediate compartment. On the other hand, the sense of responsibility that goes with understanding the significance of one's work gives unusual earnestness in avoiding leaks of information to those outside the project. The result was that within the research groups knowledge of what was going on was inevitably much more widespread than the security officers desired. Yet if any leak of significant information was traceable to the workers in the research laboratories, it was never mentioned by the security officers.

On the other hand, it would be unfair to say that secrecy as imposed by the Army had any appreciable retarding effect on completing the atomic bombs. In the early stages, before atomic energy was of interest to the Army, it is probable that secrecy regarding the work on designing chain reacting piles and the withholding, even from official reviewing committees, of information regarding explosive chain reactions may have delayed the development of the program by many months. This early secrecy was, however, self-imposed by the scientists engaged in fission studies and those charged with promoting the research. After the summer of 1942, when the Army was placed in control, I know of no time when the program of producing the materials and building the bombs was appreciably delayed by lack of scientific or technical information. Military secrecy made necessary a greater scientific effort, and it occasionally caused some close approaches to serious errors; but it cannot fairly be charged with retarding the final preparation of the bomb.

Gap between research and application

One of the unprecedented features of the atomic program was the large-scale co-operation of academic scientists, industrialists, and military men. The original ideas and their reduction to laboratory practice were primarily the contribution of men from the universities. The huge production program called for the strength of our best-organized industries. The undertaking of transferring the academic knowledge to industrial production and military use could in wartime be co-ordinated only through the military.

The obstacles in the way of smooth co-operation were many. Many of the scientists, as is usually true of inventors, wanted to retain control of the design, the construction, and even the operation of the production plants. The ideas were theirs. None but them knew how to build and operate the new devices. Not only had they earned the right to control the first use of their inventions, but also they were confident that they could bring faster production results than could others who would have to learn the processes from the beginning. The industrial men started with little faith in the practical competence of the scientists; but that little faith grew to full reliance as the two groups worked together. The concern of the scientists with the objectives, the progress, and the consequences of their work was a worry to the Army men, who could not understand why a simple order was not an adequate basis for the scientists' action.

American education has never solved the problem of preparing men for research on the new developments required by industry. The traditional training received by an engineer has been in familiarizing himself with the accepted methods of performing important industrial processes. He is rarely introduced to the search for new methods of doing the old tasks, much less for methods of doing tasks such as have not been done before. The research scientist, on the other hand, has traditionally been led to consider fundamental science only as worthy of his attention, and the practical arts as of concern only to those in a lower stratum of intellectual society. He has been taught how to find all kinds of new facts and methods, but has not learned the value of concerning himself with the things of practical use.

The enforced wartime association of scientists and engineers has had at least some effect in giving each of these professions a greater appreciation of the task the other is performing. What is more, hundreds of young men have learned by practical experience the art of engineering research. It remains to be seen whether our universities and technical schools will be able to develop a postwar education that will supply the new men so urgently needed for solving the new technical problems of industry.

LASTING EFFECTS OF THE ATOMIC CRUSADE

The great human significance of the atomic crusade is its dramatic emphasis on the vital necessity of co-operation versus antagonism, of intelligent versus emotional or unconsidered living, and of great, commonly accepted objectives. These needs have become increasingly evident with every advance of science and technology. They are, in fact, essential to civilization. But the atomic bomb has written them before us in blazing letters.

The atomic bomb has made any future war between nations armed with such weapons so disastrous to both parties as to be irrational. The only way to avoid such disaster is that of international co-operation, intelligently planned, to prevent any nation from initiating a war. Only by progressive elimination of antagonisms and inculcation of a desire for co-operation can we hope to attain the great objective of a long-enduring peace with freedom.

Science and technology have brought with them increasing specialization. Management and labor, the various trades and professions, government with its many branches, business and agriculture, school and church, each is developing toward doing a better job in a narrower field. This system greatly increases our strength and richness of life as long as we work effectively together. When antagonisms develop, however, as in a nation-wide strike or an unwillingness to give justice to a minority group, the complex modern society becomes weakened so that all of us suffer.

The value of co-operation

In this regard the atomic program is itself a notable example of the effectiveness of co-operation. Mention has already been made of the way in which the scientists, the industrialists, and the Army worked together. It should be noted that this co-operation was not based on any special friendship or understanding. It occurred rather because each group recognized that full co-operation with the others was necessary in order to perform its own task. Accordingly, each gave to the other the best help within its power. As a result of close working together over the years, there developed a much improved understanding of each other's attitudes and problems, an increased respect, and many friendships.

Within these three major groups, also, the differences were striking. Under the officers of the Regular Army were Reserve officers, enlisted men and women with and without technical training, many civilians in various capacities, and even hundreds of naval personnel. The industries employed not only engineers, but specialists of all varieties, tough construction crews, skilled and unskilled labor of all kinds. It was remarkable to see thousands of newly recruited men and women learn to do new and unheard-of jobs as operators with skill equal to or better than that of their scientist teachers. Among the scientists were voluntary and compulsory exiles from Europe who brought a large share of the theoretical knowledge and earnest enthusiasm that made of the project a crusade. Noteworthy also were the dozen Negro scientists who worked in complete equality with their white colleagues. The men from all corners of the country, from England, and from other countries, worked together with no thought of differing interests.

To all concerned it was evident that this task called for more education and training than was usual for preparing our technical men. The physics and chemistry were of a highly advanced research type, which was understood at first only by those of the most extensive training. The organizational task performed by the Army was one requiring an acquaintance with the Nation's industrial possibilities and a familiarity with Washington politics and with labor problems far beyond the ken of most engineers. Likewise, the engineering required to build a complex new plant, with not even a pilot plant as a pattern to follow, with small tolerances and details such as had never previously been heard of, called for the best skill the Nation had available. The importance of the extra knowledge and skill in making sure that the right moves would be made was thus impressed upon all who shared the enterprise. Only by intelligent planning could such a task have a chance of success.

Need for national goal

Above all, the atomic project is an example of the supreme value of a purpose. The war goal of the atomists was to build bombs that would bring victory and lasting peace. This was a part of the greater goal of defense and victory. The lesson one learns is that when people are working with a will to attain an objective, they will strive to learn how to do their part, and will willingly work with others as may be necessary for the desired result. With a goal established, training has a meaning and the will to co-operate is taken for granted. Here is the secret of co-ordinating the effort of free people.

In the success of the atomic bomb project the United States has perhaps caught a new view of its titanic strength.. It is a strength that comes when a compelling objective draws the co-ordinated effort of trained and educated citizens. Those who have shared in the atomic crusade are now insisting that this titanic strength be turned toward ensuring the world's peace and toward giving the world's people a chance to share more fully in making their lives of value. Toward this great task the mobilization of atomic strength of the Nation was but a step.

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Some Social Implications of Natural Resources

By Howard A. Meyerhoff

IN A country as richly endowed with natural resources as the United States, it is difficult to persuade our statesmen or our politicians—or, for that matter, the public—that raw materials have been so vital in shaping our development and history that they must be a primary consideration in the determination of domestic and foreign policies. Even historians, whose function it is to view historical factors in proper perspective, have underestimated the resource factor in their struggle against the so-called economic interpretation of history. But our civilization is predominantly industrial and from the moment the industrial revolution started, certain key resources predetermined the destinies of nations, though many other factors have modified the rate and the quality of progress which individual peoples have made. A brief analysis of the ingredients of industrialism will support this premise, which is basic in the thesis that I have undertaken to develop.

The industrial revolution started in England, and it was some time before it spread to other countries. Its beginnings in England are complex, but several factors in its development can be isolated. Basically the "discovery" of coal as a substitute for water in the generation of power and as a substitute for charcoal in the manufacture of pig iron and steel gave the industrial revolution its technological start, but no less important was the presence of commercial deposits of coal and iron ore in the Midlands of England. The political integration of the country minimized such problems as labor and taxation, while geographic compactness made domestic transportation a negligible item of cost. The incentive to industrialize was the growing and populous Empire, served by the merchant marine and policed by the Navy. Here was a market that offered the lure of endless profits with comparatively little competition.

There are six ingredients in this brief analysis: raw materials, technology, labor, transportation, markets, and protection; and they are still the basic factors in the complex industrial civilization of our day. Among them, however, raw materials have been the sine qua non of industrial expansion, and no national effort to industrialize has yet been successful where it has not been adequately supported by domestic or proximate supplies of fuel and iron. The early collapse of Italy and the exhaustion of Japan in the late war are definitive commentaries on the failure of the two most ambitious attempts to offset the inadequacy of native resources. The gravitation of industrial power to the comparatively few large deposits of coking coal demonstrates that, until atomic energy has actually achieved a greater diversity of application than is now in sight, industrial and political might are moored to the world's bituminous coal reserves. A sketch of the geography of coal and industry will make this point clear.

To Him That Hath . . .

In the United States the major industrial regions lie upon, or within easy access of, the two largest deposits of high-grade bituminous coal—the Appalachian and the Eastern Interior coal fields. Except for local centers of light industry, the remainder of the country is concerned with agriculture, pastoral activities, mining, and forestry. In Great Britain the manufacturing districts are localized on and near the coal seams of the Midlands and the Scottish Lowlands. In central Europe the dominant industrial position of the Ruhr made it the main target of bombing attacks. It is the major problem of postwar Europe, for its excellent coking coals, which extend into Belgium, the Netherlands, and northeastern France, make the Ruhr inevitably the economic hub of continental Europe. Coal has converted the Silesian and Bohemian basins into secondary centers of industrial activity while, similarly, in prewar Russia the coal of the Donets Basin made the eastern Ukraine and Rostov sections of Russia the industrial heart of the U.S.S.R. One of the principal objectives of the three five-year plans was the establishment of a second industrial area in and marginal to the newly developed bituminous coals of the Kuznetsk Basin in the West Siberia Region. Smaller industrial centers nourished by smaller coal mining developments have grown up in Manchuria, coastal China, the Calcutta district of India, and New South Wales in Australia, but elsewhere heavy industry either is nonexistent or maintains a precarious economic hold on a local market or a nationalistic dream of self-sufficiency, rather than on handy energy resources.

Large hydroelectric installations have in recent years modified the industrial pattern to a minor degree. Yet even here it is evident that "to him that hath shall be given," for the most ambitious programs of water-power development have been instituted in countries already endowed with supplies of industrial coal, or in those which have ready access to nearby coal in neighboring countries. Some of the latter have attempted to balance deficiencies in coal by full utilization of hydroelectric energy, but the effect is usually to extend the margins of the highly industrialized regions which are based upon coal rather than to increase the number of these regions. In Europe, for example, Italy has fully developed its water resources, and there are large power installations in France, Switzerland, Norway, and Sweden. When plotted in relation to central European industry, these developments appear in proper perspective as peripheral extensions of the Ruhr industrial area. The same is true of Canada, which ranks second to the United States in developed water power. Most of the power has been harnessed in the Saint Lawrence Lowland and the Laurentian Upland, marginal to the Lower Great Lakes industrial area.

More fortuitously, two of the world's greatest industrial nations—the United States and the Soviet Union—are its largest producers of oil and natural gas, but with these two exceptions, nature seems to have placed oil in out-of-the-way places where there is little interest in its production and use. Under these circumstances, nationals of the industrial countries have discovered and recovered it, and nearly all of it finds its way to the industrial areas for processing and consumption. The geography of oil production may reflect the whims of nature, but the geography of oil consumption is essentially the geography of industrialization. Only a few enterprising districts have succeeded in building a partial industrial economy on local oil production, but even such communities as Los Angeles and Houston have no illusions of industrial self-sufficiency.

From Him That Hath Not . . .

What applies to oil applies with even greater force to the earth's commercial minerals, for they too must make their way to the sources of heat and energy to be processed. In the Midlands and in Alabama, coal and iron ore are neighbors; in the Ruhr, in the Donets Basin, and in the Calcutta district these two complementary raw materials lie within

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reasonable distances of each other; but in the remaining industrial areas the problem of bringing the two together has taxed man's ingenuity. Lake Superior iron ore travels far down the Great Lakes to Gary or Detroit or Cleveland or Buffalo, and even overland to Pittsburgh and Youngstown. Chilean ore moves through the Panama Canal to the furnaces at Sparrows Point, Maryland, where it meets ore from Cuba and Lake Superior, and sometimes from Bilbao, Spain. And in western Siberia, magnetite from the southern Urals journeys 1,200 miles overland to Novosibirsk and Stalinsk in the Kuznetsk Basin, while coal makes the return journey to keep furnaces busy at both ends of the line. Only here is the normal movement of iron ore to coal reversed, and the exception has been made solely to reduce the all but prohibitive costs of long-distance rail transportation.

Not only does iron ore move to coal, but manganese, molybdenum, nickel, chromium, vanadium, tungsten, and the rarer ferrous alloys make the same journey, commonly from remoter parts of the earth. Nonferrous metals tend to follow suit, though for more complicated reasons. The smelting of copper, lead, and zinc is relatively inexpensive, but these metals find their readiest markets in the industrial centers. Bauxite moves to fuel for calcining or dehydration, but as a rule the alumina thus produced must go still farther to cheap hydroelectric energy for the final process of reduction to metallic aluminum. Like a magnet, coal draws metallic and nonmetallic raw materials to it because it furnishes heat, power, and by-product gas, as well as many of the raw materials employed in the chemical and synthetic industries.

We are, then, confronted by the spectacle of mineral raw materials, agricultural raw materials, population, and food being drawn in increasing quantities into a dozen industrial areas which are endowed with the most basic raw material of them all—bituminous coal. We may talk about the decentralization of industry, but man can do little more than decentralize the light industries. The heavy industries can be spread within very limited geographic districts, but hardly decentralized. Herein lies one of the principal social problems of our industrial era, although there are others with more far-reaching implications. The dozen industrial areas of the world are partially competitive, and their competitive activities are beset with domestic and international questions of vital economic and sociological import. Upon the successful solution of these problems depends the economic and political security of virtually every one of the world's peoples.

FULL EMPLOYMENT

Economic security has become a fetish of popular governments, labor unions, and farmers as a direct consequence of the depression of 1929–37, but it would be folly to claim that any of these groups uncovered the means of achieving it. It was the threat of war in 1937 that provided a fuller measure of industrial employment and the grim fact of war in 1939 that ultimately created the manpower shortage and the full employment of the war years. Full employment is momentarily being maintained, in part by the military establishments of the victorious nations, and in part by the unsatisfied demand for civilian goods. Thanks to this temporary respite, we have a brief opportunity to survey and assess the requirements of full employment and to determine how best to meet them.

Labor unions and farmers have come up with the right answer but not with the right method. Purchasing power adequate to buy the products of factories, the produce of farms, and the services of other working groups is fundamental to high production and full employment. But in this country it has apparently been forgotten that we possess resources and production facilities which far exceed domestic requirements and which make us dependent upon foreign markets for a sizable fraction of our production. Before the war this fraction was estimated to be 10 per cent, but now it is higher. Full employment in the United States depends, therefore, upon purchasing power abroad. Failure to sell our surpluses abroad will clog the American industrial machine and unemployment will follow.

EUROPEAN POLICY

Britain's industrial economy has been predicated from the outset on the need of a world market, and her methods of meeting the need stand in startling contrast with ours. Until comparatively recent years she has focused upon the multiple aspects of costs, starting with raw materials and extending through such politico-economic policies as free trade to the distribution of manufactured products by an efficient merchant marine. Some British economies do not stand up under scrutiny, but others may profitably be studied and emulated.

Britain has assiduously developed the native raw materials available within the Empire as well as those within her own tight boundaries. Endowed only with coal, iron ore, and tin, she embarked upon a program of exploration which still continues in the colonies and the Dominions. When the tin mines of Cornwall were exhausted, the tin ore of Malaya and the East Indies kept Britain dominant in the production of ore, and her monopoly of smelting and refining techniques gave her such complete control of this metal that no substitute facilities were available when the Malaysian mines fell to the Japanese early in 1942. Comparable monopolistic controls have been established in other fields—for example, nickel, diamonds, and rubber (with the Dutch). And monopoly in other forms has been a characteristic feature of British imperialism, notably the exclusion of non-British capital and management from certain colonies and the acquisition of exclusive concessions in non-British countries. In the latter category is the well-known d'Arcy concession in Iran, with its long chain of consequences, the last of which was the Azerbaijan incident in northern Iran.

Although British policy in the development or acquisition of raw materials was dictated by British industry, it has long been closely identified with government policy in a way that is foreign to the American system. Official government representation in the management of the affairs of the Anglo-Persian Oil Company is an instance which was given prominence about two decades ago, but it was by no means an exceptional instance. The British Government and British industry and trade were indissolubly linked and in combination they created international friction which at times became acute. The uneven struggle between semipublic British and private American interests for oil in the period following World War I is a matter of record.

It must not be concluded that the British policy in regard to raw materials is peculiarly British. On the contrary, the only national designation which can be given it is that it is non-American. The Dutch, the Belgians, the French, and the Russians have practiced it in one form or another and, with the exception of the Russians, nationals of these several countries have formed international cartels to exploit monopolies which could not be confined within national or single colonial boundaries. The Dutch-British combination to restrain production and trade in rubber boomeranged twice, and the second time it adversely affected the conduct of World War II and—possibly—wrecked forever a mainstay in the economy of the East Indies.

Although any statement regarding the ultimate competitive positions of natural and synthetic rubber would be premature, it can definitely be said that the artificially created shortage of rubber in 1942 greatly accelerated developments in the synthetic field. Although American capital was permitted to participate in the copper developments along the boundary of Northern Rhodesia and the Belgian Congo, the control is closely held, and had it not been for the enormous, though temporary, demand for this metal during the war, Chilean and American copper production could not have met anticipated competition from African copper in foreign markets. Protected by a four-cent tariff, American copper producers will survive by supplying the United States market; but South American producers face extinction, for basic production costs are roughly two cents a pound higher in Chile and Peru than they are in Africa.

PRODUCTION MOVES TO LOW-COST AREAS

There is no need to multiply examples, for it makes little difference whether we touch oil, rubber, copper, nitrates, radium, or food, the historical trend has been the same. Production of raw materials or of finished goods moves to low-cost producing areas. High-cost producers survive only if the low-cost producers cannot meet world demand, or if their governments "protect" them by tariff or subsidy, and the domestic consumer pays the price. Thus Americans pay two cents extra for every pound of sugar to keep domestic beet and cane sugar producers in business; four cents a pound to keep American copper miners at work; and approximately as much to enable cotton producers to raise four to six million bales of cotton more than this country normally needs. But in general, the locale of production has followed the lure of low costs: rubber moved from Brazil to the East Indies; copra forsook the West Indies for the East Indies; quinine likewise changed hemispheres, as did cacao, despite the retention of a feeble hold in Ecuador and the Caribbean countries. Radium moved from Colorado to the Belgian Congo, and it may be on its way to the Arctic Circle in Canada. Nitrate production has partially deserted Chile for widely scattered synthetic plants, and rubber may now be headed in the same direction.

Some of these movements are worth a brief analysis. In the cases of rubber, copra, quinine, and other forest and agricultural products which were successfully introduced into the Malaysian-East Indian region, three vital factors were involved: capital, management, and labor. The history of rubber affords an illuminating example. Rubber was native to the Amazon Basin, where it grew without cultivation. The British and the Dutch transplanted it to Ceylon, Malay, and Sumatra, but it was some time before the managerial genius of the Dutch evolved the plantation system of cultivation. Then followed the development of large plantations, kept scrupulously clean by cheap and abundant native labor. Brazilian producers, harassed by a scarcity of labor, could not emulate the Dutch system, nor could they match in quality the rubber which the Dutch and the British placed on the market. The demise of the industry in Brazil was rapid and so complete that the combined efforts of the United States, Brazilian, and Peruvian Governments and a corps of experts, backed by unlimited capital, were unable to revive it, even under the grim requirements of war.

LABOR

The moral of the story is clear. In the case of rubber and of other products requiring laborious cultivation and other manual operations, low-cost production depends upon labor when other factors are equal. Recognition of this fact was basic in Dutch colonial policy, and it was evidently the cornerstone of German military and administrative policy in the "New Order" of Europe and of Japanese policy in the "New Order" of the Far East. In a less spectacular way, it was the cheap and abundant labor available in the South that led so many textile manufacturers to abandon mills in New England and set up operations in the Carolinas, Tennessee, and Alabama. The same factor took the needle industry out of New York and into Puerto Rico, and when the wage-and-hour law equalized labor costs in Puerto Rico, the industry moved as far afield as China, Italy, and Czechoslovakia.

Labor is a primary resource to those who need it, but it has not yet achieved comparable importance to those who have it. Germany and Japan had a momentary vision of its importance en masse but no comprehension of the prerequisites to its successful exploitation. Mussolini, with one of the most crowded countries in Europe, was so obsessed by the stupid illusion of Italian self-sufficiency that the military significance of forty-five million Italians meant more to him than their economic and political value.

If the British have learned officially that manpower is an economic asset, they have scrupulously refrained from revealing the knowledge, although the industrialists of Britain have long exploited British labor. Conditions in the coal mining districts of England and Wales were publicized during the depression years, but somewhat less has been said about working conditions aboard ships of the much vaunted British merchant marine. Any disinterested study of the industrial situation will reveal that the British have been maintaining a favorable competitive position for British goods in world markets primarily at the expense of labor. Domestically, Labor governments have effected social reforms, but chiefly to counteract or partially offset the abuses and inadequacies of the British industrial system—if it can be called a system. Abroad in the Empire no policy can be discerned, but here too there has been local exploitation of labor by industrial interests. The mines of Africa are not a worker's paradise and plantation conditions in many of the colonies leave much to be desired, but in general the natives in the colonies are left to their own devices and to the vicissitudes of local conditions.

Only the Dutch have evolved a well-ordered administration of native labor in the colonies, but its admirable order and efficiency have not endeared the system or its administrators to the native population. The current uprisings in Java and other islands of the Netherlands East Indies are more than manifestations of racial and nationalistic unrest. They are protests against the most efficient—and humane—system of labor exploitation that has thus far been devised.

In review, labor appears to be an unreliable factor if one is seeking low costs. The textile manufacturers who moved South found it impossible to hold wages at low levels, although it is true that wage differentials between North and South are still marked and are so well established that a rather idealistic National War Labor Board gave them formal recognition and sanction. But it is evident that the densely populated nations of the earth, like Italy, Germany, Belgium, the Ukraine, England, India, Java, China, and Japan, have a labor potential which will exert a critical influence on costs and on world economy. Whether these labor pools be utilized for the production and processing of raw materials—mineral or agricultural—or for the use of the raw materials in manufacturing, the law of migration of work will inexorably operate. Any operation requiring a large amount of manual labor will migrate to these populous regions, and to those which also possess industrial fuel will go the raw materials that nourish, or draw nourishment from, coal and the heavy industry founded on coal.

It behooves United States labor, United States politicians, and the United States public to ponder this important trend before United States costs are jacked up beyond the reach of world markets, upon which full employment is dependent. How much money a worker makes is far less significant than how much he can buy, and to buy anything at all he must stay in competition with the rest of the world.

TECHNOLOGY

Labor, however, is not the only factor involved in costs, and to some extent high labor costs can be counterbalanced by technological ingenuity and invention. At times inventive ingenuity has been charged with the high crime of creating technological unemployment, and the charge may soon be heard again as war-inspired devices, designed to save manpower, increase production with fewer employees. But over the years technology has revolutionized industry, and it is likely to repeat the performance. It has certainly revolutionized the sources of raw materials.

In the field of mineral raw materials, geographic exploration has turned up many a new deposit of ore, but not a few of them have remained unused for years, and even for decades, until technological discoveries enabled man to exploit them. The development of techniques whereby the low-grade copper ores became available to commercial processes of recovery; the application of electrolysis to the reduction of alumina to metallic aluminum; the design of more efficient equipment, like the boats and the loading and unloading facilities that handle Lake Superior iron ore; the uncanny selectivity of flotation in the concentration of ores of metals and even nonmetals—these and many other equally familiar developments have transformed the mining industry and have freed us from dependence upon a comparatively small number of high-grade mineral deposits and a limited number of metals. Even so, mining, milling, and metallurgical progress has barely kept pace with an insatiable industrial demand that has called for larger quantities of a greater variety of metals during the past generation than the human race consumed in all preceding history.

Indeed, technology has been called upon, not alone to devise production facilities, but to "invent" raw materials. Currently the processing of wood bids fair to transform the industries based on forest products. Within a comparatively few years plastics have been produced more rapidly than names have been found to designate the many varieties. As if by magic, despite the cumbersome equipment employed, the air is made to yield nitrogen for nitrates, and coal is changed more readily to nylon than nylon is to a pair of precious stockings.

As applied to natural resources, technology has so altered the geography of raw materials as to precipitate social revolutions in many parts of the earth. We think of the profound effect of the discovery of gold at Sutter's Mill in opening up California and ultimately, with the construction of the first transcontinental railway, in binding the far-flung corners of this country into a closely knit national unit. But do we realize what the development of oil in the steamy Maracaibo Basin has done to and for Venezuela? or what the exploitation of oil may do in Saudi Arabia?

Not all the consequences of new developments are beneficent. For many years the nitrates of the Atacama Desert made Chile the most solvent of South American countries. Then, in 1913, Germany perfected the nitrogen-fixation process, freeing itself from dependence on Chilean nitrates as it waged World War I. The nitrate supply was a sore trial to all other contestants, all of which set out to develop their own nitrogen-fixation facilities as soon as the war was over. Copper saved Chilean economy for a time, but African copper and depression ended that, and the country has had hard times ever since. As a current example, following the bitter experience of highly localized and monopolistic production of rubber, the United States may develop synthetic rubber to the point of impairing the economy of the East Indies.

Technology brings changes that are both profound and kaleidoscopic. It transplants civilization to the wilderness and to the desert; it makes and breaks economies in regions and in nations with limited resources; it creates problems of obsolescence which wreck investments; it brings necessities and luxuries within reach of more people. It is an undiscriminating social force which, thanks to the atomic bomb, our politicians and statesmen are confusedly trying to direct and to control.

But we are dealing with technology as a factor in costs, and it must be evident that, like abundant labor, it causes the migration of industrial demand to the cheapest source of raw material. In following technological applications, industrial demand has migrated widely over the face of the earth, and its peregrinations should hold one important lesson: supplies of raw materials have no political or national affiliations—they are international. Freedom of access is vital, at least to the industrial nations. Freedom to supply native resources is equally vital to any nonindustrial nation or colony, for the time to dispose of native resources, particularly in the mineral category, is at the figurative moment when industrial demand and technological developments give them their greatest cash value and their maximum utility value. The notion of conserving irreplaceable raw materials for some hypothetical future use is pointless in a world whose needs are changing rapidly, and particularly is this true in countries which lack the energy resources to process their own mineral resources.

Technology is thus leading industrial demand over the face of the earth, shopping for industrial raw materials in those places where, at each given stage of technological progress, they may be acquired most economically. Each major industrial region may seek the same raw material from the same region, just as the Midlands and the Ruhr sought high-grade iron ore from the Kiruna district of northern Sweden in the days before the war. No nation can supply all its needs at home, and in the competition for raw materials abroad the successful competitor will be the one that offers in trade the best-priced products, rather than the best price for local products. Again the need to stay in competition with the rest of the world is self-evident.

LAND

Although industry uses many irreplaceable raw materials, replaceable products are playing an ever increasing role, not alone in feeding the human race, but also in providing it with industrial employment. Technology has greatly changed land use in such a variety of ways as to defy listing. Modern transportation has opened up remote regions and has led to specialization and regionalization of land use that was unthinkable one hundred years ago. Refrigeration has transformed the *tierra caliente* of Caribbean countries into banana plantations and, in combination with irrigation, has converted a desert such as the Imperial Valley into truck gardens. Mechanization has greatly enlarged the economic land unit for many crops and has encouraged—and has itself been encouraged by—migration of population from farm to city. Laboratory techniques have developed new uses for old products, new products from old crops, and new products from new crops. Experiment has evolved hardier or more prolific plants and animals, and chemistry coaxes higher yields from every acre, until the dismal predictions of Malthus seem remote in a far more populous world than the one in which he lived, though their theoretical validity may still be sound.

Through all the changes which have occurred, a clearly defined order can be discerned. The geography of forests, crops, and animals has steadily become a function of climate, which in turn is a function of latitude, precipitation, topography, and elevation. The result, though logical, borders on the phenomenal, for regions in different hemispheres have developed startlingly similar characteristics, and even their peoples show tendencies to evolve comparable habits and outlooks. The wheatlands of the Argentine are scarcely distinguishable from those of Canada; and the members of Roy Chapman Andrews' Third Asiatic Expedition so reacted to the wheat-raising country beyond the wall in north China that they named their first camp "North Dakota." The Gaucho of the Pampa has been likened to the cowboy of the Great Plains, and the sheep rancher of South Africa or Australia has much in common with the sheep rancher of Wyoming or Texas.

LAND CULTIVATION

There is a temptation for the geographer and the historian to conclude that these striking similarities in land use reflect the normal transition of any "new" country from the pioneer to the mature stage of development. The agricultural history of the central United States, which finds recent parallels in Canada, Argentina, and Australia, appears to support this view. In accordance with this interpretation, only countries in which land is cheap and population scant can afford to use land for extensive agriculture. As population increases there is—it is claimed—an irreversible trend toward intensive agriculture.

The interpretation cannot be convincingly supported. China, India, and central and eastern Europe, with their dense agricultural populations, evolved agriculturally before modern techniques were evolved. Only in the Ukraine has a serious effort been made to modernize the agricultural pursuits of the farming population, and much as one may question the arbitrary methods employed by the Soviet Government in "collectivizing" the farms, it must be concluded that mechanization, coupled with drastic reduction in the rural population, has definitely resulted in more effective use of land and of manpower. Perhaps no other government has the "nerve" and the power to take similar steps, but comparable results could be achieved in the Danubian Basin, and perhaps in Poland. In Poland such a possibility may be presented as a postwar program, for the acquisition of the coal deposits of Silesia will provide the Poles with the basic raw material of industry and with the means of employment for displaced farmers.

In China and India similar steps could be taken, but more slowly. In both these countries there are extensive alluvial plains on which the cultivation of rice could be mechanized, as has been done in Louisiana; and in both countries there are the mineral raw materials, including coal, to provide work for displaced agriculturalists. But the numbers of people that would be involved in such a change are staggering, and the program would succeed only if carefully and cautiously planned.

A critical appraisal of the agricultural situation throughout the world leads inevitably to a revision of the dubious dictum that in a country with a growing population the land will be used more and more intensively. The fact is, land seeks the most economical use, and this means the highest yield of the most valuable crop with the minimum expenditure of manpower.

This is an economic law that is not well enough known or observed, but its inexorable effects are evident enough—sometimes painfully so. As has been noted, we pay two cents a pound extra for sugar which Cubans can grow more cheaply, solely to keep our sugar producers growing sugar rather than some other crop. It becomes increasingly expensive to support our cotton farmers as good cotton-growing lands in Brazil, Egypt, and southwestern Siberia enter production and either compete in the world market or cut down demand from former customers like Russia. The situation will not improve as the "cotton belt" of Brazil, Argentina, and Paraguay expands to its full climatic and agronomic limit.

Plainly the renewable raw materials—food, agricultural raw materials, and animal and forest products—obey the same economic law that governs all other natural resources: production moves to regions of low cost. Production can be maintained elsewhere only by subsidy or tariff, or the inability of low-cost producers to meet the full demand. In so far as domestic food supplies are concerned, proximity to market will ordinarily equalize costs with more distant competitors; but with foods for foreign markets and agricultural raw materials for industry, competition makes the cost factor paramount. Ultimately, therefore, the farmer finds himself in the same box with labor—in a type of competition that makes high farm prices a major hazard to his prosperity. His concern is rightly with the purchasing power of his money but wrongly with gross income.

SOCIAL SIGNIFICANCE OF ECONOMIC TRENDS

Our industrial civilization is founded on six major and seven or eight minor deposits of industrial coal. Two of the major deposits are in the United States, two are in the U.S.S.R., one is in Great Britain, and one is in the Ruhr and its environs. The minor deposits are domestically or regionally important chiefly to the nations which have them. The belated development of the Kuznetsk coal field of western Siberia and the belated modernization of the Donets mines, not to mention internal problems, have thus far kept the U.S.S.R. concerned primarily with domestic demand, but Soviet coal reserves are ample for the country to enter into international competition.

As of 1946–47, however, the United

CALCUTTA CENTRAL

States, Great Britain, Germany, and Belgium have an energy potential in excess of domestic requirements, and at the moment this Nation and Great Britain have industrial production facilities in excess of any conceivable domestic demand. These resources alone make them inevitable competitors for foreign raw materials and for foreign markets. Until war terminated all normal international trade, Germany was also in the competition and could have been a more formidable rival had she not been so preoccupied with rearmament. Given a chance to achieve complete industrial recovery, Germany and her neighbors will feature once more in international trade.

War has seriously depleted our mineral resources: our supply of high-grade iron ore is perilously low; we are no longer self-sufficient in bauxite; copper production can be maintained only if protected by a tariff totaling 50 per cent of foreign mining and refining costs; we never have had sufficient stocks of the ferrous alloys, tin, antimony and other lesser minerals; the adequacy of our oil production is in doubt. More and more we must enter the open market for raw materials, and our chief competitor and all our prospective competitors are nations that have never practiced freedom of access to raw materials.

With production of manufactured goods migrating to low-cost producers we shall find ourselves in competition with nations whose social legislation may be advanced, but whose wage policies, working conditions, and cost of living fall far short of United States standards. With technology and mechanization also tending to move production and processing of mineral and agricultural raw materials out of this country to areas of lower costs, we are pursuing political, labor, and agricultural policies which threaten to hasten these movements and so to reduce the available employment as international trade slowly seeks a postwar norm.

WORLD COMPETITION

Technology and the productivity of land are factors which man may control, if only because they are calculable and finite. Paradoxical as it may seem, the human factor in production costs is the only one beyond human control. While United States labor insists on the highest wage in industrial history, it may be matching its ambitions against the policy of another nation willing to get business at the expense of labor; or against a war-torn country bent on rehabilitating itself by underbidding all competitors for the sake of getting work. People are easily manipulated, as was demonstrated by the fanatical patriotism of the underpaid and undernourished Japanese, or by the blind hope of the Germans in the ultimate security which the New Order would provide.

Under conditions which now exist, it is dangerous for any group to commit the United States to a policy or to place it in a position that will handicap it in international competition. We may believe that the control of prices is vital, and it is. But prices cannot be divorced from costs of production, and it is the height of stupidity to delude ourselves with low prices when we subsidize producers who cannot make ends meet because of high costs. Our industrial, economic, and social future must be guided by several elementary facts:

1. We have the principal raw materials of industrial production—coal, oil, water power, and a modest but incomplete and exhaustible stock of mineral, forest, agricultural, and animal products.

2. We need freedom of access to those raw materials we lack.

3. We are in competition not only for these materials, but also for world markets in which to sell our surpluses.

4. Our competitors never have had a policy of free competition.

5. Our competitors have a larger supply of labor in their industrial districts than we, and their labor has never enjoyed a standard of living comparable with ours.

6. Our economic and social standards depend entirely upon our ability to meet this competition.

7. Our ability to compete depends upon sound foreign and domestic policies, but chiefly upon the genius of American workers, farmers, and industrialists to produce efficiently what the world needs at a price it can afford to pay.

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The Atomic Dilemma

By Bernard Brodie

IN BOOK VI of *Paradise Lost,* the Angel Raphael is recounting to Adam the story of the war in Heaven which resulted in the fall of Satan and his followers. After a day of fighting, Raphael relates, the issue is still in doubt, although the rebellious angels have received the more horrid injury. Gathered round their campfire that night, their leaders consider how they may overcome their disadvantage. Satan is persuaded that their inferiority is one of weapons alone, and he announces that he has already invented the instrument which will shift the balance. The instrument, of which several are developed and constructed at his direction during the celestial night, turns out to be a field gun—which, as Raphael assures Adam, is likely to be reinvented by the latter's own progeny "in future days, if malice should abound."

The following day the rebel seraphs, exploiting to the utmost the benefits of tactical surprise, secretly bring up their field pieces and commit them at a critical moment to action. At first the infernal engines wreak dreadful execution. But the loyal angels, not to be surpassed in the application of science to war, seize in the fury of the moment upon the "absolute" weapon. Tearing the seated hills of Heaven from their roots, they lift them by their shaggy tops and hurl them upon the rebel hosts. Those among the latter who are not immediately overwhelmed do likewise. In a moment the battle has become an exchange of hurtling hills, creating in their flight a dismal shade and infernal noise. "War," observes Raphael, "seemed a civil game to this uproar." Heaven is threatened with imminent ruin, and the situation is resolved in the only way left open—the intervention of God himself, who introduces what the modern radio announcer would unquestionably call the "super-absolute weapon."

MAN'S DILEMMA

The war in Heaven casts into its ultimate dramatization the chief dilemma which confronts modern man and which, while commonplace, has with the coming of the atomic bomb reached truly tragic if not catastrophic proportions—the dilemma of ever widening disparity in terms of accomplishment and of magnitude of consequences between man's physical inventions and his social adaptation to them.

Milton's angels were able to devise, perfect, and apply military inventions with a celerity which mankind has happily not yet attained. But even in the most favorable of contexts and with an omniscient and all-powerful God as a directly interested party, these nearly perfect celestial beings were unable to prevent the outbreak among themselves of a civil war which was saved from being suicidal only by the ulterior circumstance that angels cannot die. Their superlative wisdom is manifested in the application of new techniques of warfare, but the origin of the war itself is marked by the absence or lapse of wisdom. Although Milton was troubled by this paradox, his experience with mankind persuaded him that it did not represent an absurdity. And in this respect man differs from the angels most notably in his capacity to die. His status is also different, for it would be wildly optimistic in view of existing evidence to deduce that nature or nature's god is anything but indifferent to his destiny.

The last proposition is, however, fervently rejected by many who subscribe to no particular religious faith but who are nevertheless in a mood to demand miracles. One form of this faith healing is the insistence on the part of such persons as former Secretary Henry Wallace that atomic energy applied to peaceful uses will ultimately abolish poverty and thus war itself. There is not the slightest possibility, even if the most optimistic predictions concerning its future development are realized, that atomic energy will prove the key factor in abolishing poverty wherever it exists among the large masses of mankind. Their poverty is not due primarily to the expensiveness of the fuel now used for the derivation of power, light, and heat. But what is more to the point, there is an impressive absence of evidence to support the notion that poverty looms large among the causes of war. The evidence points in fact to the contrary. For good and quite apparent reasons, the most poverty-stricken nations of the world happen also to be among the most pacific in their external relations. Modern war is a luxury which can be indulged in only by the relatively well off.

DUAL POTENTIALITY

I should regard it as a basic proposition in evaluating for human welfare the significance of atomic energy that the promise of eventual benefits resulting from its peacetime use are relatively unimportant compared to the menace inherent in the existing accomplishment of the atomic bomb. We may be solaced by the promise, but we should not be deceived by it. Cancer is a horrible disease, and the radioactive materials generated in uranium piles may carry us far towards alleviating or even eradicating it. But under modern conditions of sanitation, neither cancer nor the whole complex of known diseases even remotely threatens the basic fabric of our civilization, as the atomic bomb clearly does.

In terms of power, nature has already bountifully endowed man with fuels to turn his machines and propel his vehicles. The increasing efficiency of those machines and vehicles has been generally assumed to be a good thing, and the use in them of atomic fuels—to the degree that such fuels prove adaptable—will no doubt greatly accelerate the trend towards higher mechanical efficiency in the tools of peacetime pursuits. But the rewards of the end result inevitably appear meager against the bare fact that a few pounds of substance can blast whole cities into oblivion. The scientists who worked on the bomb must have felt that intuitively, for Professor Smyth tells us that many of them wished during 1943 and 1944 that the experiments upon which they were engaged would fail.[1]

It is impossible to say whether or not the voluntary forfeiture by mankind of the nonmedical peacetime uses of atomic energy would have made easier the control or suppression of its military uses. Without ever having been properly explored or investigated, that question seems already to have become a dead issue. For better or for worse, mankind is apparently committed to the maximum possible exploitation of atomic energy, with all the attendant risks involved.

VISIONARY OR REAL

Another miracle, the expectation of which has now become widespread among an extraordinary number of otherwise sophisticated people, is represented by the symbol "world government." I use the word "symbol" advisedly, because my own limited experience with proponents of the principle is that few of them have in mind a blueprint for a system which would make sense to themselves, let alone others. Their entire intellectual capital in this respect is an insistence that mankind will now be united by an intensification of the kind of fear—the fear of one another—which has always thus far had the opposite result.

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[1] Henry D. Smyth, *Atomic Energy for Military Purposes* (Princeton: Princeton University Press, 1945), p. 224.

Prominent among those who are determined to bring our politics abreast of our physics, in other words to institute "world government," are many of the leading scientists who assisted in the production of the atomic bomb. They are, understandably enough, gravely shaken by the appalling miracle they have wrought. They are also aware of their limitations as producers of further miracles in their own field. None of them, so far as I am aware, has any confidence in the ability of science to devise some agent which will counter the bomb and rob it of its terrors. They find it more profitable, therefore, to enter a field in which they have no specialized knowledge to encumber them in their designs, to mitigate the effect of their earlier work.

It is really unfortunate that these scientists have not been consistent in their methodology. If they had used in the laboratory the same kind of reasoning they have demonstrated in the political forum, we should not now have the atomic bomb to worry about. The physical scientist learns at the very outset of his career to analyze the properties of his materials and to adjust his techniques completely to those properties. He has, to be sure, created elements not previously found in nature; but even plutonium, once created, showed itself to be a true child of nature in having a will of its own concerning its proper behavior as Element No. 94. It has specific characteristics which determine its utility, and in order to exploit that utility the physicist had to adjust to all the peculiar manifestations of its coy and spritely individuality. The physicist would never dream of exhorting an element to behave like something which it was not, and it is only because he wastes no time doing so that he is able to accomplish such marvels.

The physicist might therefore be expected to appreciate the fact that the cure for the world's ills does not lie in exhorting men, or the states into which they have become organized, to behave in a way which the facts of day-to-day events indicate to be utterly foreign to their natures. When so avid a promoter of international organization as Mr. Herbert Evatt of Australia rejects the idea of world government as "impossible of acceptance" by small states; when at the other end of the scale Soviet Russia pours sarcastic denunciation not alone on the idea of world government, but even on the idea that the United Nations needs strengthening through limitation or abrogation of the veto; when we see no evidence at all among the masses of our own people of enthusiasm for comparable ideas—it begins to appear that the advocacy of world government can hardly be a fruitful tack to follow.

TWO GIANTS

But such an argument is merely a challenge to the prophet. If people refuse to see the light, then it is his task to make them see, and to that task he turns with a fervent good will. Unfortunately, the political scientist is still unable to retire from the lists. It is his duty to point out that even the entire willingness of existing governments and their peoples to enter a system of world government would not suffice to make such government possible. As Professor Jacob Viner has pointed out, we live in a world dominated by two giants, each of which is too strong, relative to the total power potential of the world, to be proper members of a world government. Professor Viner observes:

In a narrow legal sense, sovereignty can easily be formally surrendered, but actual power is more difficult to surrender and can be effectively surrendered only to an agency still more powerful. In the present state of the world, such an agency with superior power not only does not exist but cannot be manufactured out of existing ingredients, even if the genuine will to do so existed, *unless that will goes to the extent of preparedness on the part of the United States and of Soviet Russia to dismember themselves.* Splitting the United States and splitting Soviet Russia seem to present a more difficult problem than splitting the atom proved to be.[2]

Thus, where Chancellor Hutchins of the University of Chicago asserts that world government is "necessary, therefore possible," one might overlook the *non sequitur* and reply that what is manifestly impossible it is a waste of time to regard as necessary. What is necessary is in any case not world government but control of the atom bomb, *by whatever means are possible.*

NATIONALISM AN OBSTACLE

And where in the same article Chancellor Hutchins admonishes certain persons, whose negative views on world union he regards as reprehensible, to "read *The Federalist*"—thus bringing in the inevitable example of the American Union—one might refer him especially to the second of the papers known by that name. In this paper John Jay, after expressing his feelings of gratification at the striking geographical unity of America, proceeds with the following observation:

> With equal pleasure I have as often taken notice that Providence has been pleased to give this one connected country to one united people—a people descended from the same ancestors, speaking the same language, professing the same religion, attached to the same principles of government, very similar in their manners and customs, and who, by their joint counsels, arms, and efforts, fighting side by side throughout a long and bloody war, have nobly established general liberty and independence.

Today, as in Jay's day, we see a world divided by exactly the obverse of those characteristics which united America. It is a world in which nationalism has developed to a pitch undreamed of in his day and in which the only political force sufficiently important to qualify it, namely, international communism, is even more disruptive of harmony. One might retain grave doubts whether a world made up exclusively of independent communist states would have notably better chances for world peace than the present one.

In any case, if we mean by world government a political system in which the central authority would have *adequate power to prevent warfare* either against itself or among its members, then the only kind conceivable to me at this stage of the world's development is one ruled from Moscow and ruled about as closely as the Soviet Union is ruled today. For the only form of acquiescence in world government which I can visualize at this time is that won by world conquest; and of the two nations which come anywhere near possessing sufficient resources to accomplish such conquest, the Soviet Union is the only one prepared and equipped to follow through with permanent policing and administration.

At least one distinguished scientist, who is certainly not a Marxian, has assured me that he would rather live in such a world than in one marked by armament races in atomic bombs. That is an opinion which I can respect, though I cannot agree with it. Neither can I agree that it represents our sole choice of alternatives.

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[2] Jacob Viner, "The Implications of the Atomic Bomb for International Relations," in "Symposium on Atomic Energy and Its Implications," *Proceedings of the American Philosophical Society,* Vol. 90, No. 1 (Jan. 29, 1946), p. 56.

URGES REALISM

It behooves the political scientist to set about analyzing the problem of atomic-age security in a two-power world. It is a world in which the polarity of power is matched by a polarity of ideologies, and in which the ordinary barriers to human communication and sympathy, difficult enough to scale at best, are many times augmented by deliberate state policy on the part of one of the two primary powers. If the scholar insists on speaking in terms of an ideal world wholly different from that which confronts him, he is merely rejecting his problem. Nor can he conceal that rejection by avowing concern only with long-term objectives. To the remark of Lord Keynes that in the long term we are all dead, we may now add the observation that in the short term we may all be killed.

The business of devising and pursuing a sound national policy in a desperately dangerous world is something which demands all our intelligence as well as our moral strength. If the words "national policy" sound too narrow, I submit that national policy is the only policy upon which we can hope to exercise any influence, and is our only channel for affecting international policy.

LIMITED WARFARE

I turn now to a consideration of proposals which, whether or not I agree with them, are at least based on the determination to work with the materials available rather than those we would like to have. One is the old idea of limiting the nature of war in the tradition of the Hague Conventions, or at least of restoring the force which once was thought to adhere to those conventions. The idea was recently resuggested in an article in *Harper's* by the distinguished British military writer, Captain Liddell Hart, who takes the position that since it seems impossible to eliminate war, we should at least attempt to restore to war the limited character it possessed in the eighteenth century.

At first blush such a proposal seems as fanciful as those I have just been deprecating. But it has at least the virtue of representing a situation which did actually obtain historically. Moreover, it is in part reflected in the proposed draft convention presented by Mr. Gromyko before the Atomic Energy Commission, which on the surface is primarily a convention for the outlawry of the atomic bomb. The proposal originally developed by the board headed by Mr. Lilienthal, and since offered by Mr. Baruch before the Atomic Energy Commission as the official American proposal, is itself essentially a plan to limit the nature of wars, differing essentially, however, from previous proposals along such lines in the tight system of guarantees incorporated in it. Thus, a discussion of the Liddell Hart idea is in part also a consideration of the necessity for those guarantees which are certainly the main stumbling block in either the Lilienthal plan or any comparable plan.

The limited-warfare characteristic of the period between Grotius and Napoleon was never a matter of deliberate restraint of power in the sense that a renunciation of total warfare would be today, for the concept of total war did not exist, and under the circumstances prevailing could not exist. The limitations obtaining were imposed in part by material considerations. The campaigns were fought by mercenaries, who would desert if pressed too hard. On the other hand, it was necessary to restrain their avidity for plunder partly as a matter of discipline, partly out of fear of retaliation in an era when all territories were at one time or another subject to the passage of enemy armies, and partly out of desire to refrain from offending a population which was not necessarily predisposed to hostility. The relation between an enemy's civilian population and his military forces was tenuous enough at best, and under the economic doctrines prevailing, appeared even more tenuous than it actually was. An affront against the civilian population was therefore not easily covered by the excuse of military necessity. Moreover, with the great mass of the people living on a subsistence level, there was not much to be squeezed out of them in any case.

War was the calling of the aristocracy, whose lopsided code of morals, however deficient in other respects, permitted no compromise with the code of the duel. War was an art governed by tradition and managed by conservatives. Weapons which represented a marked departure from tradition were somehow underhanded, and the one thing a gentleman did not do was use underhanded weapons in a quarrel. The princes between whom and for whom the wars were fought felt always that they owed certain obligations to each other. It was the plebeian Napoleon, exploiting the nationalistic fervor of the French Revolution, who involved the populations in war and who, especially in Iberia, plunged hostilities back into the bestial character of the Thirty Years' War.

MODERN WAR IS TOTAL WAR

Today all the sanctions making for limited war have collapsed—moral, social, and economic. Whether or not the two great wars of this century were in fact "total wars" (and there were in fact important qualifications to "totality" in each belligerent country even during the recent war), the fact is that the basis for total warfare may now be considered firmly established. Total warfare stems from total mobilization, and total mobilization could have no meaning prior to the industrial revolution when there existed no great margin of resources to be converted to war. Total mobilization is also a technique, which had to be discovered, evolved, and perfected. The history of that evolution is a history of social inventions, some of them revolutionary in the extreme. The governments of great states today have not only vast resources available to them for war purposes, but also something which they did not have prior to the twentieth century—the knowledge of how to mobilize them. It would be much easier to expunge from the human race the knowledge of how to produce the atomic bomb than the knowledge of how to produce total mobilization.

Some observers in considering the chances of effectively outlawing the atomic bomb have taken comfort from the fact that poison gases were not used during the recent war. There is little warrant, however, for assuming that the two problems are analogous. Apart from the fact that the recent war presents only a single case and argues little for the experience of another war even with respect to gas, it is clear that poison gas and atomic bombs represent two wholly different orders of magnitude in military utility. The existence of the treaty outlawing gas was important, but at least equally important was the conviction in the minds of the military policy-makers that TNT bombs and tanks of gelatinized gasoline—with which the gas bombs would have had to compete in airplane carrying capacity—were just as effective as gas, if not more so. Both sides were prepared not only to retaliate with gas against gas attack but also to neutralize with gas masks and "decontamination" units the chemicals to which they might be exposed. There is visible today no comparable neutralization agent for atomic bombs.

Neither side in the recent war wished to bear the onus for violation of the obligation not to use gas when such violation promised no particular military advantage. But, unlike gas, the atomic bomb can scarcely fail to have fundamental or decisive effects if used at all. That is not to say that any effort to outlaw use of the bomb is arrant nonsense, since such outlawry might prove the indispensable crystallizer of a state of balance which operates against use of the bomb. But without the existence of a state of balance—in terms of reciprocal guarantees against manufacture of the bomb or reciprocal ability to retaliate in kind if the bomb is used—any treaty purposing to outlaw the bomb in war would have thrust upon it a burden far heavier than such a treaty can normally bear.

The mere promise not to abuse the tremendous powers of potential aggression inherent in atomic energy, especially where such abuse would result in a monopoly of atomic bombs on the part of the abuser, would have even less chance of success than the Kellogg Pact. As the London *Economist* recently put it:

> It is not simply that nations cannot be trusted to keep their words. Perhaps, in this instance, they would. The trouble is that the risks of atomic warfare are so enormous that no national government can afford not to make its own atomic preparations unless it is absolutely certain—or at least as confident as human ingenuity can make it—that other nations are keeping their promises. . . . It is not the probability of treachery but its mere possibility that would wreck the system.[3]

INTERNATIONAL SUPERVISION

Thus it was realized from the beginning by all those who applied their minds to seeking solutions applicable to earth rather than heaven that the essential problem of the control of atomic energy was that of devising effective systems of international inspection within the separate nation states. But the technical problems seemed enormous, almost insuperable. Many of the scientists who had worked on the Manhattan District project maintained that there did not even exist a sufficient body of trained personnel to carry on the inspection on the scope which they deemed necessary. They added that few first-rate scientists would be willing to devote their lives, or any substantial part thereof, to a purely police function, and that if they did so they would quickly cease to be first-rate scientists.

On the other hand, it was also clear that the main problem was a political rather than a technical one. As Professor William T. R. Fox[4] has pointed out, the United States has experienced little difficulty in controlling atomic research and development within her own territory. Presumably, other nations would have a comparable experience, and the degree of success of any international inspection system would depend primarily on the willingness of the member states to assist in its work. The real difficulty is that the more elaborate the inspection system deemed necessary to fulfill minimum requirements, the less acceptable it must be to the states within which it would operate, and the greater would be the frictions and irritations resulting from its operation.

THE AMERICAN PLAN

The great contribution of the State Department Board of Consultants' plan —or the Lilienthal report as I have been calling it for brevity—is that it promises enormously to simplify the inspection problem. To the extent that it represents human ingenuity successfully applied to a great social problem, it is a social invention of impressive magnitude. The five men who were primarily responsible for it had only two months in which to work, and they have all the reason in the world to congratulate themselves on their accomplishment. But before we lose ourselves in rejoicing, we must remember that a social invention, like any mechanical one, has to work before it can be deemed successful, and whether it will work depends first of all on whether it will be accepted. The excellence of the thinking from which this plan developed will no doubt enhance the probability of success, but the only ultimate test is the empirical one.

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[3] "The Atomic Plan," *The Economist*, June 22, 1946, pp. 995 f.

[4] William T. R. Fox, "International Control of Atomic Weapons," in Bernard Brodie (Ed.), *The Absolute Weapon: Atomic Power and World Order* (New York: Harcourt, Brace & Co., 1946), p. 186.

The outstanding feature of the Lilienthal plan is its distinction between "safe" and "dangerous" activities, the latter of which would be relegated exclusively to an International Atomic Development Authority. The Authority would enjoy a monopoly of all mining of uranium and thorium and would use these materials to produce "denatured" fissionable substances which could not be used for atomic bombs without the expenditure of much time and effort to remove the denaturant, but which would still be of use for any peacetime purposes presently conceivable. These materials could be issued, under close registration, to the separate nations or even to private agencies. Because the Authority would combine in itself the positive functions of research and production as well as the negative one of inspection, it would be much more attractive to the requisite scientific personnel. The inspection problem would be greatly simplified by the fact that *any* detection of "dangerous" activities being undertaken by individual nation states, regardless of magnitude or purpose, would constitute *ipso facto* a confirmation of violation and a "clear warning" to other nations.

It is obvious that a great deal depends on the real effectiveness of denaturing, which Mr. Baruch, at the very moment of presenting the Lilienthal plan, described as having been exaggerated in the public mind. If true, the exaggeration was no fault of the public, but of government press releases and of the Lilienthal report itself. But what we do not now know is the status of intelligence on that all-important question. For without effective denaturing, there can be no really safe activity.

LIMITATION ON SOVEREIGNTY

Also we must observe that very large functions, including the control of all mines from which uranium or thorium could easily be extracted and the prospecting for further uranium or thorium deposits, would be in the hands of the international authority operating within the member states. Such procedures would certainly be unprecedented in degree if not in character, and would entail a real abatement of traditional sovereignty. However desirable abatement of sovereignty may be in principle, there is no profit whatever in speaking of it in the abstract. The question is, would Russia—to take only the most obvious and difficult example—agree to such a system and co-operate sincerely to make it work? Would she accept and co-operate with the very sizable amount of inspection which would still have to be carried on as a guarantee against violation or evasion?

We have no real answer to such questions yet, but it would be foolish as well as dishonest to deny that our experience with Russia thus far on matters which might be considered even remotely comparable gives us no basis whatever for optimism. To any country, the idea of foreigners carrying on within its territories, and without any direct control from its government, large industrial, exploratory, and policing operations would have to overcome a good deal of abhorrence, but as applied to Russia the idea is completely subversionary. Against this fact we are expecting that Russia will see the problem as we do—an extraordinary assumption in itself—and finally agree with us that there is no other way out.

Then there is the question of the veto. It seems to have been an elementary tactical error on our part to have made an issue of the veto so early in the negotiations, especially since no one clearly knows to what kinds of decisions in the program the veto will have relevance. Nevertheless, we know that the veto as it exists today is certainly relevant at least to the grave issue of sanctions—of whatever character they may be—and we know also that Russia has made the veto the trademark of her foreign policy. Any attack upon it she deems an attack upon her. We know also that the veto has thus far operated to frustrate and baffle the Security Council, and that an international atomic authority which is subjected to anything like a comparable obstacle in its operations simply will not work.

Even with the best of good will on all sides, there are numerous grave questions which the Lilienthal report raises but does not answer and which are bound to make difficult the progress of the negotiations. For example, the report mentions the desirability of so distributing the primary plants for the manufacture of the fissionable materials that in the event of the collapse of the system, the previously existing balance of power will not be too seriously distorted. This is a simple and realistic recognition of one of the factors which will determine the acceptability of any plan. But we can easily imagine the difficulties which will ensue when the attempt is made to reduce this dynamic idea to a precise calculus.

DIFFICULTIES AHEAD

Finally, the negotiations are not going to be carried on in a vacuum. They will be directly affected by diplomatic events in other fields, where the going is rather rough these days—to put it most moderately. We may expect that concessions to our points of view will be attended by bills for counterconcessions in areas which we may deem irrelevant. More important, we will have to know at every point where we can afford to yield on details without compromising essentials.

The Russian statements thus far reveal nothing substantial concerning the Russian attitude except the not unreasonable or surprising desire to see us divest ourselves of our existing bombs before any real negotiations take place—which I take to be the sole real purpose of the draft treaty for the outlawry of atomic warfare. That treaty, it may be recalled, contains in its first article the provision that within three months of its entry into force, all the signatories will destroy whatever bombs they may have.[5] We also have Russia's expression of dislike of any tampering with the veto principle. Beyond that we have nothing specifically negative, and we even have a few things which are positive. We have the commitment in principle to sanctions, to exchange of scientific information, and vaguely to some form of control—though it would be interesting to know the significance of the Russian proposal to divide the latter two functions between two separate agencies after the Lilienthal report had stressed the unique merits of combining them.[6]

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[5] The full text of Mr. Gromyko's address, in which the draft treaty was presented, was published in the *New York Times* for June 20, 1946; also in the *Bulletin of the Atomic Scientists,* Vol. 2, Nos. 1 and 2 (July 1, 1946), pp. 8–10.

If the negotiations are prolonged and difficult, there will be reason for hope. Any quick termination would result either from outright failure or from so facile a solution that we should have to view it with suspicion. Meanwhile, our Government will need at every turn the criticism and support of a sober and informed public opinion; and one may earnestly hope that specialists in the field of political science will assume their proper function of leadership in the instruction of that public opinion.

In order to do so, the political scientists will have to give a convincing demonstration of having tough minds as well as soft hearts. They will certainly have to reject as incompatible with science the standards of Hollywood, where all stories must have a happy ending. For the scientist it is better to arrive at truth than at an optimistic conclusion which is false—though, incidentally, I should regard as the most pessimistic of all possible conclusions the notion that our safety depends on a complete revolution in the hearts and minds of men. Finally, the political scientist must reject as meaningless and useless the frequently expressed appeal in support of a given plan—repeated even in the Lilienthal report—that "the alternative is catastrophe." Since that appeal has already been made in support of several different plans, it cannot be wholly true of any of them.

The alternative to any magnificent plan which fails to work or win acceptance is always another plan, which may be less magnificent and less generous in its promises of security but which may have a better chance of working—so long as we do not deceive ourselves as to its actual content of security. The pursuit of security has always been an unending one, in which, like Keats's lover on the Grecian Urn, we are never more than "winning near the goal." Absolute security against the atomic bomb lies irretrievably in the past, and neither panic nor incantations will help us to reinvoke it.

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[6] Since this paper was delivered at the University of Michigan, Mr. Gromyko has announced before the U.N. Atomic Energy Commission (July 24, 1946) that the "United States proposals, referring to United States Memorandum No. 3, in their present form cannot be accepted in any way by the Soviet Union either as a whole or in separate parts." It should be noted that Mr. Gromyko's remarks of July 19 and 20 indicate acceptance by the Soviets of the principle of "exchange of information pertaining to peacetime uses," but rejection seems definite and emphatic of the principles of inspection and of abrogation or limitation of the veto. This writer has decided, however, to leave the text of the above paper unchanged and to permit the reader to make his own interpolations.

World Government and the Control of Atomic Energy

By Herbert W. Briggs

IN HIS essay *On Compromise,* John Morley writes:

> Success in politics, as in every other art, obviously before all else implies both knowledge of the material with which we have to deal, and also such concession as is necessary to the qualities of the material. . . . To hurry on after logical perfection is to show one's self ignorant of the material of that social structure with which the politician has to deal. To disdain anything short of an organic change in thought or institution is infatuation.[1]

The United Nations Charter came into force October 24, 1945, less than four months after it was signed, and, in the words of the Secretary of State, "is now a part of the law of nations." Its inadequacies were not the result of any oversight but were deliberately written into the Charter in order that the Organization might be firmly grounded in the political environment in which it must operate.[2]

In the period between the signing of the Charter and its coming into force, atomic energy had been turned by man against man. Relief that this elemental force had first been used in the cause of freedom could not still thoughts that its first applications had been destructive and that in other hands it could be used to enslave. Although the calculable effects of the release of nuclear energy merged quickly into the incalculable, certain things were clear. The large-scale development of atomic energy could not long remain the monopoly of one or two states. There was no foreseeable defense against atomic weapons. Because of its unparalleled destructive efficiency, the atomic bomb was a relatively cheap weapon. Unless mankind could learn to control its use, incalculable misery and destruction would one day encompass the world—at least the civilized world.

The Hope of World Government

Not so clear were the political implications of the bomb. Would the desire for freedom from fear overcome the traditions of national freedom? Was world government the counterpart in human affairs of the atomic bomb in the realm of science? Apparently many thought so. Atomic physicists, Supreme Court justices, radio commentators, journalists, and even college presidents signed manifestoes for a world state, a world government, a limited world government, or perhaps a government of one-half a world. Atomic scientists, trained in the arts of reducing matter, inert or active, to human control, faced the problems of human nature with comparable optimism and techniques. The logicians—the apostles of "either-or"—attempted to substitute logic for experience as a solvent for problems of politics.

The practical problem of how to get from here to there—how to go about setting up a world government—apparently troubled few of those who regarded world government as a solution for man's ills. It was popular to proclaim a lack of faith in treaties, although states went on concluding new ones every day; and the skeptics themselves were not always aware that they were talking of treaties when they proclaimed the need for this or that new "charter."

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[1] John Morley, *On Compromise* (London: Chapman and Hall, 1874), pp. 175–76.

[2] See John Foster Dulles, "The General Assembly," *Foreign Affairs,* Vol. 24, No. 1 (Oct. 1945), pp. 5–6.

SOVEREIGNTY—AN ENIGMA

For those who face the problem at all, the favored first step towards world government is usually termed "the abolition of sovereignty." Unless it be the term "liberal," it is difficult to think of any other term of political science which has been so misunderstood and abused as "sovereignty"; although, on reflection, the word "democracy" has its possibilities. What is this "sovereignty" which must be abolished? Justice Oliver Wendell Holmes, in a decision of the United States Supreme Court, once stated that "sovereignty is pure fact." The Brazilian Foreign Minister, at the San Francisco United Nations Conference, referred to sovereignty as something in which a state can be wounded. Let me quote him: "Brazil has never hesitated when wounded in its sovereignty . . . to assume the responsibilities and the burdens of war." Wendell Willkie once said that "sovereignty is something to be used, not hoarded." Phrases such as "the sovereignty of the people," "the soverignty of the law," "political sovereignty," "state sovereignty," "national sovereignty" are, to paraphrase Carl Becker, permitted to slip off the tongue or the pen without fear and without research.

Now, if there is any common factor which characterizes these assertions, it is a lack of clarity. Just what would be abolished by the abolition of sovereignty? A study of the concept would seem to justify the conclusion that sovereignty is not a fact; nor is it actual power; it is a series of more or less contradictory theories or ways of regarding the authority of the state in the field of law. According to one such theory, the state is the sole source of law on matters to which it extends its jurisdiction, but cannot itself be subject to legal rights and obligations. This conception carries no necessary implication of actual power to enforce the rule of law. Within the state, actual power to enforce law is likely in the long run to be a concomitant of lawmaking; but as between two so-called sovereign states, the actual power of either to enforce its own national law in its own territory may conceivably depend on the sufferance of the other, or possibly of an even more powerful state. Legal power should not be confused with actual power.

However, it is another aspect of this concept that leads to a seeming paradox: either sovereignty as the supremacy of the state in the realm of law is the negation of international law; or it may presuppose the existence of international law, specifically of a principle that each sovereign state must respect the sovereignty (i.e., the law-creating competence) of every other state. It is only in the writings of a few theorists that sovereignty is regarded as the negation of international law. In the practice of states, the necessity for jealous reservation of "matters which are essentially within the domestic jurisdiction of any state" and the fact that infringements of "sovereignty" are regarded as violations of international law justify the opinion of Judge Anzilotti of the Permanent Court of International Justice that by sovereignty "is meant that the State has over it no other authority than that of international law."

The use of the term "sovereignty" to describe such contradictory conceptions suggests its lack of utility in political debate. Too much is expected from its "abolition." Suggestions for "renouncing," "limiting," "pooling," "merging," or "transferring" sovereignty—most of which are contradictions in terms to the analytical jurist—divert attention tangentially from basic realities of legal authority and actual power and cloud in obscurantist symbolism our perception of what needs to be done.

THE PROBLEM OF AUTHORITY

Yet the symbol must stand for something, even though we may not readily identify it. Legal authority, at least, is expected by the abolition of sovereignty to be transferred from Washington to, let us say, Connecticut. Whether the centers of power on the Eurasian land mass would have shifted perceptibly because of a transfer of legal authority from Moscow to a capital of the world state in Connecticut might remain the subject of an academic doubt. How, in other words, can a world state be set up with both the legal authority and the actual power to govern the world?

Conceivably, either Soviet Russia or an Anglo-American bloc could set up a world state by conquest. The former, by infiltration, threat, and use of force, might, given time, establish such a strong world position as to venture a world war to achieve a world Communist state. The Anglo-American bloc of western states might, if it hurried, use its atomic bomb monopoly to establish a world state by force, although the military victory would be the easiest part of such a program. Since in either case the centers of western civilization would be rubble, and since the rationale for setting up a world state is to avoid atomic war, there is little health in such speculations.

Equally idle are speculations as to launching a world state by voluntary agreement between existing states. The juridical basis upon which such an organization rested would be nothing less—or more—than a treaty. Its binding force would depend on the international law of treaties which advocates of world government so lightly dismiss in favor of what they designate "world law." International government could be set up on such a juridical basis—indeed, it has been—but not a world state. Ultimate legal authority and actual power cannot be finally delegated by those who possess them.

OF SLOW GROWTH

Even if next year a world state could be set up, endowed by its charter with supreme executive, legislative, judicial, and administrative powers, the gap between its legal authority and social and political realities would be so enormous as to condemn it in advance to futility. Social life is regulated not only by law and institutions of government, but by differing usages, traditions, moral and religious conceptions, and political and economic ideologies.[8] The creation of any world state is more likely to be the result of an evolutionary development.

In any particular stage of development, law must have roots in these social and political realities or be reduced to the fatuity of a Kellogg Pact. In the present stage the very defects of the United Nations are evidence that it accords with basic realities; but evolution towards the next stage is already noticeable. The decision of the Security Council to retain jurisdiction over the Soviet-Iranian controversy, even though both states asked for the dismissal of the case, is an important example of the way in which an international organization can, by evolutionary process, increase its authority at the expense of its members. The gathering pressure against the veto privilege will serve to test whether or not the atomic bomb has advanced political possibilities beyond existing legal techniques.

Further stages might include an increase in the number of nonsovereign Members of the United Nations, a gradually advanced legislative process, dispensing with ratifications, the enactment by special majority of rules of law binding on Members, or even the enactment of laws directly binding upon individuals in delimited fields. By a process of evolution, during which the gap between law and social reality is never allowed to become too great, an international organization can gradually acquire authority and power never delegated to it. Thus the last stage—the creation of a world state—although a revolution in legal theory, might come to seem but a relatively slight change in practice.

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[8] See Dietrich Schindler, "Contribution à l'étude des facteurs sociologiques et psychologiques du droit international," *Recueil des Cours de l'Académie de Droit International de la Haye,* Vol. 46 (1933), p. 237.

This dream, it should be noted, is anathema to the advocates of world state or world government. The first immediate step, writes Thomas K. Finletter, is to set up "a rule of law." Later on he changes his timetable by stating that law cannot exist without government; but let me quote him:

> . . . We must avoid being taken in by the idea of working into the rule of law by gradual steps. Gradualism is just another way of avoiding the issue. . . . The fallacy of the gradualist notion lies . . . in its failure to recognize that the first step must necessarily be the final one; that no nation can give up its nationalist defenses before . . . [it has security].[4]

Now if this statement means anything at all, it seems to say that there is, indeed, no hope for a world state.

ARGUMENTS AGAINST A WORLD STATE

Before examining whether a world state is the only alternative to annihilation in an atomic war, it might be well to investigate some of the assumptions which seem to make a world state so desirable to its advocates. Where did they ever pick up the notion that a world state would be a democracy? If the population of the world is two billion, simple arithmetic and an elementary knowledge of government are sufficient to show that over one and one-half billion people either do not live in states or territories with a democratic form of government or are governed by regimes militantly opposed to political democracy. Many less than 500,000,000 people, i.e., less than one-fourth of the world's population, live under a democratic form of government, let alone the many republics here included which are democracies only in name. Even if we assume that all men in their hearts are democratic, we must not overlook the traditions and political realities under which they have grown to adulthood, or the ignorance, illiteracy, inertia, or active ideological hostility to majority rule.

Moreover, a world legislature based on popular representation—assuming that we could establish it—would find itself without any community of values and standards, the indispensable minimum for viable government. The alternative would be the exercise of arbitrary world power by the few. Gerhart Niemeyer writes:

> Because of the vastness of the territory over which it ruled, a world government would be . . . less dependent on consent, . . . more standardized, and therefore culturally more oppressive, than any other government. Being able to rely on countless sources of support, against which the people of any particular nation would be a hopeless minority, the power of a world government would inevitably be more absolute than that of any . . . [existing national government].[5]

Against a government so divided that it is unable to govern or against governmental absolutism, force is an alternative which cannot be ruled out by law.

This leads to further assumptions underlying the plea for a world state. One writer seems to assume that as soon as political units lose their sovereignty, wars automatically cease between them as a mechanical consequence of their being merged into a larger unit. Others favor passing a law against war and placing "the collective might of the world community" or "preponderant military power" behind its enforcement. Unfortunately, collective might or preponderant military power must have a geographical location, and this collective might appears, on examination, to be Russian or American or the might of other national groups. True, our assumption is that there will be no Russian state, but it is clear that the Russian nation will remain and the people of Russia will think like Russians and believe what Russians believe; they may even act like Russians.

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[4] Thomas K. Finletter, "Timetable for World Government," *The Atlantic Monthly* (March 1946), pp. 53–60.

[5] Gerhart Niemeyer, *Law Without Force: The Function of Politics in International Law* (Princeton: Princeton University Press, 1941), p. 387.

What this suggests is that there may be such a thing as politics—even in a world state. Politics is a struggle for power; and where men hold deeply entrenched views on nationalism, politics, and economics, the assumedly automatic application of the collective might of the world community turns out to be a matter of power politics—as it is today. Nor is the issue avoided by the assumption that since world law would apply directly to individuals, organized national resistance to political, economic, or social legislation, applicable ***urbi et orbi,*** would become unlikely or impossible.

In fine, any belief that we can escape the difficulty by setting up a world state, making its laws directly applicable to individuals, passing laws to solve problems which have baffled the efforts of men since the beginning of time, and devising automatic sanctions for their enforcement, rests upon the greatest assumption of all—that human nature and the world upon which the world state emerges will already have changed so as to ease the tasks of world government.

ALTERNATIVES

This line of reasoning is considered irrelevant and even unfair by those who advocate not a world state but "a limited world government." However, their "limited world government" appears indistinguishable from a world state. Thus, Thomas Finletter, after advocating "a limited world government," i.e., "a government narrowly limited to the essential powers . . . necessary to stop war," proceeds to refer to it as "a superstate . . . of narrowly limited powers." The confusion here exhibited is more than verbal. The question is one of jurisprudence as well as of politics. It is not the quantum of powers exercised by a governmental entity that determines its juristic character, but its competence to define the limits of its own authority. If Mr. Finletter's "limited world government" is competent to set the limits of its own authority and is, as he says, "superior to the national states," it is more than a world "government"; it is a world state, even though it delegates to its central world government only the powers "necessary to stop war," and leaves other powers elsewhere.

The juridical alternative to a world state is not a world government but an international government, whose authority is conferred and delimited by treaty. This alternative is rejected with scorn by Mr. Finletter, who suggests that if Russia declines our offer of "a limited world government . . . we should form the supranational government with those nations who are willing to join it." This is only another way of urging Two Worlds instead of One—a fatality to which we are so close that it should not be encouraged.

INTERNATIONAL CONTROL OF ATOMIC ENERGY

While those who press on for world

government reject the alternative of international government, the leading states of the world are currently examining its possibilities. The most urgent specific problem now confronting states with the need for government—indeed, the problem which has given current impetus to the frantic agitation for a world state—is the reduction of atomic energy to international control. The problem has scientific, legal, and political aspects.

As we face the scientific aspects, it is our astounding good fortune to discover that the problem has definable boundaries. Let me quote the *Report on the International Control of Atomic Energy* prepared for the Department of State by a Board of Consultants:

> . . . if . . . tomorrow or a year hence we might reasonably expect atomic energy to be developed from clay or iron or some other common material . . . the problem of protection against the misuse of energy thus derived would be vastly more difficult. But such is not the case. The only scientific evidence worthy of regard makes it clear that in terms of security uranium is indispensable in the production of fissionable material on a scale large enough to make explosives or power. The significance of this fact for effective international control will appear.[6]

Although uranium and thorium are not rare elements, they apparently occur in high concentration in only a few areas of the world. "This would seem to mean," concludes the Report, "that the areas which need to be surveyed [for raw materials], to which access must be had, and which would ultimately have to be brought under control, are relatively limited." Similarly, the actual production of fissionable materials sufficient to make atomic weapons or power requires so great a scientific and engineering effort as to reduce the problem of control to manageable proportions. Finally, the Board of Consultants was of the opinion that "a dividing line can be drawn between dangerous and nondangerous activities," thus permitting the establishment of boundaries between international and national action.

BARUCH PROPOSAL

The existence of these favorable factors, among others, led the Board of Consultants to propose a bold and positive plan for international control of atomic energy: the creation of an International Atomic Development Authority with exclusive jurisdiction to own or effectively control world supplies of uranium and thorium and to conduct all intrinsically dangerous operations in the nuclear field, while leaving "individual nations and their citizens free to conduct, under license and a minimum of inspection, all nondangerous . . . operations."

On June 14, 1946, the United States Government, through its representative Mr. Bernard Baruch, proposed to the United Nations Atomic Energy Commission,

> the creation of an International Atomic Development Authority, to which should be entrusted all phases of the development and use of atomic energy, starting with the raw material and including:
>
> (1) Managerial control or ownership of all atomic energy activities potentially dangerous to world security.
>
> (2) Power to control, inspect, and license all other atomic activities.
>
> (3) The duty of fostering the beneficial uses of atomic energy.
>
> (4) Research and development responsibilities of an affirmative character intended

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[6] *A Report on the International Control of Atomic Energy* (Washington, D. C.: Department of State Publication 2498, March 16, 1946), p. 11. The Report was prepared by a Board of Consultants consisting of David E. Lilienthal, Chairman, Chester I. Barnard, J. R. Oppenheimer, Charles A. Thomas, and Harry A. Winne.

to put the Authority in the forefront of atomic knowledge and thus to enable it to comprehend, and therefore to detect, misuse of atomic energy. To be effective, the Authority must itself be the world's leader in the field of atomic knowledge and development and thus supplement its legal authority with the great power inherent in possessing leadership in knowledge.[7]

DETAILS OF PLAN

In elaborating on these basic proposals, Mr. Baruch stated that "the Authority should set up a thorough plan for control of the field of atomic energy, through various forms of ownership, dominion, licenses, operation, inspection, research and management by competent personnel"; and "after this is provided for, there should be as little interference as may be with the economic plans and the present private corporate and state relationships in the several countries involved"; that the Authority should conduct continuous surveys to obtain and maintain complete and accurate information on world supplies of uranium and thorium, "and to bring them under its dominion." He emphasized that "important measures of inspection will be associated with the tight control of raw materials, for this is a keystone of the plan." He continued that the Authority "should control and operate all plants producing fissionable materials in dangerous quantities and must own and control the products of these plants"; that for reasons of security, activities entrusted exclusively to the Authority, as well as stockpiles of raw and fissionable materials, should be decentralized and distributed throughout the world; that the nondangerous activities be subject to review, and in any case to licensing and inspection by the Authority.

Mr. Baruch followed the Report of the Board of Consultants in emphasizing that by granting a monopoly of intrinsically dangerous activities to the Authority, the difficulties of inspection would be reduced to manageable proportions; for, quite aside from whether its motives were lawful or unlawful, the mere fact that a state engaged in or permitted the mining of or the production or possession of fissionable materials would be illegal. Not the motive but the operation would be an unambiguous danger signal.

In creating an international organization adequate to control the development and use of atomic energy, continued Mr. Baruch, states should renounce the use of atomic weapons, stigmatize violations of the rules of control as international crimes, and fix condign and certain penalties for: (1) illegal possession or use of an atomic bomb; (2) illegal possession, or separation, of atomic material suitable for use in an atomic bomb; (3) seizure of any plant or other property belonging to or licensed by the Authority; (4) willful interference with the activities of the Authority (this would include interference with ingress or egress of inspectors); and (5) creation or operation of dangerous projects in a manner contrary to, or in the absence of, a license granted by the international control body.

Mr. Baruch concluded that "there must be no veto to protect those who violate their solemn agreements not to develop or use atomic energy for destructive purposes"; adding that

> before a country is ready to relinquish any winning weapons it must have more than words to reassure it. It must have a guarantee of safety, not only against the offenders in the atomic area, but against the illegal users of other weapons—bacteriological, biological, gas—perhaps—why not?—against war itself. In the elimination of war lies our solution . . .

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[7] Department of State Bulletin, Vol. XIV, No. 364 (June 23, 1946), pp. 1057–62.

COUNTER PROPOSAL

In their preliminary statements to the Commission, the representatives of at least eight other states accepted the general principles of the United States proposals as a basis for discussion. Only two members of the Commission—Soviet Russia and Poland—supported a more restricted and extremely ambiguous Soviet plan for atomic disarmament. The essence of the Soviet plan was a treaty obligating states not to use atomic weapons, requiring them to forbid the production, possession, and use of atomic weapons, and stigmatizing their production, possession, or use as "a most serious crime against humanity," but leaving the enforcement of these obligations to the national legislation of each state. Although the draft agreement submitted by Mr. Gromyko made no provision for international control of atomic energy other than to forbid its use in weapons, and made no provision for international enforcement, he envisaged the possibility of later setting up an international system of supervision and control for the limited purpose of outlawing atomic weapons, subject to a veto similar to that conferred by the United Nations Charter on the permanent members of the Security Council.

PROPOSALS CONSIDERED

In comparing these two plans, it should be emphasized that their legal bases are identical. Neither the United States proposals nor the Soviet plan envisages a world state or even a limited world government. The juridical foundation of both plans is a treaty. A treaty is an instrument of international law establishing legal rights and obligations for the states which accept it, although it can be stipulated that its provisions apply to individuals. Not even in the language of sovereignty is a treaty regarded as an infringement of sovereignty; its conclusion is rather the exercise of a sovereign right.

It is in the extent of their stipulated legal obligations and measures of enforcement that the two proposed treaties differ radically. The Soviet draft is largely limited to the negative function of outlawing the use of atomic weapons by states and of requiring states to enact national legislation forbidding the production of atomic weapons, although it is far from clear whether such legislative prohibitions would apply to governments. Very little is accomplished by adding that violations of the treaty "shall constitute a most serious crime against humanity."

On the other hand, the American proposal is positive and marks a great advance in the theory and techniques of international control. Like the Soviet plan, it would outlaw the use of atomic weapons, and even go further in making certain violations of the rules of control "international crimes." Thus, not only illegal possession or use of atomic weapons, but the mere fact of owning or producing fissionable materials without license would be an international crime, as would seizure of any property or plant under the control of the International Atomic Development Authority or any willful interference with its inspection, operating, or other activities.

Beyond these negative provisions lies the positive feature of the American plan: the proposal to entrust to an international agency "all phases of the development and use of atomic energy"—not merely of atomic bombs. The delegation by states of legal authority to an international organization is not novel. It happens all the time; and the past century has witnessed a progressive increase in the setting up of such collective agencies. The novelty of the American proposal on atomic energy lies in the vast extent of the legal authority to be granted to the international agency by the states which conclude the treaty. The legal powers of ownership, dominion, licensing, management, operation, inspection, research, supervision, and control are designed to confer on the Authority a monopoly in the field of atomic energy, even if jurisdiction to punish violations is conferred on another organ of the United Nations.

The delegation by states of such extensive governmental powers in the field of atomic energy to an international organization would profoundly affect certain accustomed ways of national life and would even influence and restrict the determination of national policy. For this reason we must examine the political implications of the American proposal.

TREND TOWARDS INTERNATIONALISM

The mere fact that so bold a proposal has been made by one of the great powers of the world and has been deemed worthy of further consideration by many other nation-states shows progress in thinking internationally. It is eloquent testimony to the need, although it is not evidence that the proposal will be accepted. Calculations as to the probability of acceptance, while centering about Soviet Russia, will be aided by an analysis of the specific powers proposed for the International Atomic Development Authority.

International ownership and control of property, whether real or personal, within the territory of a state is far from rare. Although less frequent than national ownership of embassies and nondiplomatic public property in foreign states, international ownership and control have been established for property of the League of Nations and other international organizations within state boundaries. The enactment by Congress, late in 1945, of the International Organizations Immunities Act, the recent enactment of comparable legislation in other countries, and the current implementation of provisions in the United Nations Charter which deal with legal capacity, privileges, and immunities, are indications of an increasing trend towards international ownership and control of properties necessary for the performance of international functions.

For the international management and operation of activities such as uranium mining and the production of fissionable materials it is more difficult to discover precedents, but in times of crisis communications, shipping, trading, relief, and innumerable other normally national activities have been subjected to international control. With regard to licensing, there is the notable international experiment for controlling production and traffic in narcotic drugs.

Further study of these forms of international control could usefully be made even with the knowledge that no one of them alone is proposed for the international control of atomic energy.

The same is true of the proposed system of inspection. The Board of Consultants was in agreement that a system of international inspection superimposed on an otherwise uncontrolled exploitation of atomic energy by national governments would not alone be an adequate safeguard. One of the Board's principal contributions was a careful assessment of the human factors involved in a system of inspection and its suggestion that the inspectors might be distinguished scientists who were participating in positive and constructive activities in addition to their police function. But inspection, however conceived, could certainly not be limited to regions, industries, and information under the international control of the Authority; and to state officials who find necessity for an "iron curtain," inspection would be anathema.

ANALYSIS OF SOVIET VIEW

The small group of leaders in Soviet Russia undoubtedly grasp the political significance of the atomic bomb and of the benefits which would accrue to Russia from its international control. Their present unwillingness to propose more than the unimplemented outlawry of atomic weapons cannot be explained merely by the assumption of ill will. Soviet opposition to international ownership, operation, and inspection may be based in part on a gamble that the United States would not in any probable circumstances use atomic weapons against Russia, at least until Russia acquired and used such weapons; and in part the opposition may be due to the overriding political necessity—as seen from Moscow—of insulating Russia's politico-economic system and her people from outside scrutiny and influence.

If these calculations are correct, i.e., if the Soviet leaders are convinced that the international control and supervision of atomic energy constitutes a greater threat to the Soviet system than the presently unlikely use of atomic bombs against their country, we can only call their attention to the eventual danger to all if no adequate international controls are set up, and explore a compromise with them. If today Soviet Russia, instead of the United States, were the sole possessor of atomic bombs and the methods of producing atomic energy, she would have unparalleled bargaining power. Apparently the same cannot be said of the United States, since all the world discounts our use of atomic weapons for selfish political purposes. Any hasty compromise is likely to concede more to the Soviet position than it gains.

This suggests a further reflection: an unimplemented pledge by any state whose use of atomic weapons for political purposes cannot be discounted in advance will fail to provide security for the other signatories. It is not that governments lack faith in treaties. The belief that treaties are made only to be violated when occasion arises is not infrequently held, as Frederick Dunn points out, by the same person who at times exhibits a naïve faith that any international problem can be solved by signing a treaty.[8] This faith is usually accompanied by a notion that what international law needs is a high-pressure system of enforcement.

Statesmen and jurists, better informed, know that treaties are more regularly and honestly observed than violated, and that the use or threat of force ordinarily has very little to do with this pattern of behavior. The reasons are clear but too seldom noted. The treaties most likely to be observed are those which recognize and develop within a legal framework a positive mutuality of interests. The treaties most likely to be violated are those which, taking no account of the political considerations which sometimes cause states to disregard law, nevertheless attempt to control political conduct by a series of negative or prohibitory rules.

This is simply another way of saying that a treaty which merely prohibits atomic weapons puts a premium on violations, because observance of the treaty can be regarded as more dangerous to the security of a state than the illicit production and possession of atomic bombs. The American proposals are designed to make observance more attractive and less dangerous than violations would be. Of this the Soviets probably remain to be convinced.

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[8] Frederick S. Dunn, "The Common Problem," Introduction to Bernard Brodie *et al.*, *The Absolute Weapon: Atomic Power and World Order* (New York: Harcourt, Brace and Co., 1946), p. 7.

Any compromise should proceed from the fact that the Charter of the United Nations already contains more inclusive legal obligations than the outlawry of atomic weapons. Article 2, paragraph 3 of the Charter reads: "All Members shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered." And paragraph 4 stipulates: "All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations." The primary Purpose of the United Nations is "to maintain international peace and security." These obligations are legally binding on Soviet Russia, the United States, and forty-nine other states whether or not the Security Council fails in its "primary responsibility for the maintenance of international peace and security" (Art. 24).

COMPROMISE ON ATOMIC CONTROL

A plan more adequate than the Soviet proposals but which might go a long way towards meeting possible Soviet objections to the official American proposals was published in June 1946 by the Carnegie Endowment for International Peace. This plan, carefully prepared and superbly drafted by a Legal Subcommittee in consultation with other legal, political, and scientific experts, is in the form of a Draft Convention on the Utilization and Control of Atomic Energy.[9]

The plan "rests upon a different appraisal of the feasibility of international inspection of radioactive materials than that of the Board of Consultants" and is closely related to the United Nations Charter. It contains great similarities to the Soviet proposals in accepting the principle of national ownership of uranium mines and certain operations for manufacturing atomic energy, in prohibiting, except as authorized by the Security Council for the maintenance of international peace and security, only the production, possession, and use of atomic weapons and plants exclusively suited for the production of atomic weapons, and in retaining the veto. It provides that a failure by any state to comply with the prohibitions relative to the production or use of atomic weapons may be found by the Security Council to be a threat to the peace or a breach of the peace, and the Security Council may decide to take measures in accordance with Chapter VII of the United Nations Charter, subject to the veto. This provision is supplemented by a drastic obligation upon all parties to the treaty to retaliate immediately against any state which makes unauthorized use of atomic weapons, the retaliation being an exercise of the "right of individual or collective self-defense" provided for in Article 51 of the Charter.

The plan approaches the American proposals in important respects, but attempts to simplify the task of international inspection by providing for the obligatory establishment of national atomic energy commissions which shall be subject to the supervision and control of an International Atomic Energy Commission to which broad and positive legal authority is granted.

This brief sketch of the Legal Subcommittee's proposals, while inadequate for an appraisal of the extent to which they meet the minimum requirements for security, will serve to indicate the considered judgment of distinguished legal, political, and scientific experts that an acceptable compromise can be devised in the not unlikely contingency that Soviet Russia refuses to accept all the principles of the American proposals.

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[9] *Utilization and Control of Atomic Energy, A Draft Convention* prepared by the Legal Subcommittee of the Committee on Atomic Energy of the Carnegie Endowment for International Peace, New York, June 1946.

VALUES FOR PEACE

In politics there are no automatic or permanent solutions (if, indeed, the word "solutions" properly describes the object of our search). If we find a way of controlling the development and use of atomic energy it seems very unlikely that the same controls could be applied to the development and use of bacteriological cultures. Yet we may agree with Charles Merriam that "the mind is king, not the atom. We trapped the atom; . . . not by accident, but by deliberate design, by organization and ingenuity. . . . To say that modern man is obsolete is an interesting literary phrase, but the precise opposite is true." [10]

The harnessing of nuclear energy is nevertheless an easier task than controlling human conduct in the use of this elemental force. "In the elimination of war lies our solution," said Mr. Baruch; but men have fought for security, order, justice, welfare, and freedom, as well as for material gain, and for these ends will fight again if necessary. Neither world state nor international government can eliminate war if these be denied. Our long-term task is clear: the establishment of these ends of government—security, order, justice, welfare, and freedom—as more than a substitute for war. Our immediate—our urgent—tasks are also clear. The present alternative to the United Nations is not world government but chaos. Because the drafters of the Charter were politically wise in basing it on a knowledge of the restricting political and social environment in which it must work, we need not await that organic change in thought or institution which may long elude us. With unconquerable persistence we can develop the scarcely tapped resources of the United Nations Charter and extend its metes and bounds. We are able to act now.

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[10] Charles E. Merriam, "Physics and Politics," *American Political Science Review,* Vol. XL, No. 3 (June 1946), pp. 445–46.

Civil Liberties in the Atomic Age

By Robert E. Cushman

IT WOULD be unwise for us not to be on the alert to discern just how the atomic bomb with its still unmeasured consequences is going to affect our civil liberties, and to determine what can be done to avert any serious threats. That this is not merely foolish foreboding is clear from certain unhealthy symptoms which are already discernible in our national reaction to the atomic bomb, as well as in the attitude of some of our public leaders who bear responsibility with respect to our civil liberties.

A few weeks ago Congressman John E. Rankin of Mississippi managed to suggest in some twenty lines in the *Congressional Record* the two major threats to civil liberty which seem to me to inhere in the atomic bomb, although naturally he did not label them as such. In the first few sentences he proposed complete military domination over the atomic bomb for a period of at least five years. He then asserted, as he has so often before, that communism throughout the world and here at home is dedicated to the overthrow of this Government, and that we must take drastic measures to protect ourselves from that menace.

I wish to build my discussion in the main around the two points suggested by Mr. Rankin's remarks. I wish in the first place to discuss the extent to which the atom bomb is likely to increase the military domination of public policy in this country, and to emphasize the threat to civil liberty which is bound to result from any such increase. I wish secondly to consider the threat to civil liberty resulting from the fear complex engendered by the atomic bomb—a fear complex directed especially toward Russia and all things Russian, and expressing itself in a revival of witch-hunting patterned on the familiar formula of condemning as subversive all liberal and progressive thought because of its alleged association with communism and communists.

MILITARY CONTROL AS A THREAT TO CIVIL LIBERTY

The suggestion that military domination over the atomic bomb is likely to endanger civil liberty is not an attack upon the Army and Navy. No rational person can withhold his admiration of the magnificent achievements of our armed forces, or his gratitude for their services to the Nation during the war just ended. To see a threat to civil liberty in any broadening of the area of military control is merely to be realistic about the essential purposes, nature, and methods of military power. The job of the Army is to fight and to be at all times in readiness to defend the national security. To be able to do this, it must be so organized and disciplined that it can move fast. It must make quick and final decisions grounded upon military considerations and usually surrounded by complete secrecy. It cannot afford the luxury of the deliberate procedures, open discussion, and meticulous concern for minority rights which should characterize the functioning of a democratic state in dealing with questions of public policy.

Because the Army is the kind of organization it is, because it has the kind of job it has, and because it must use the kind of methods it does, we have wisely built a fence around it, both in our thinking and in our constitutional provisions, to keep it from moving into areas in which there is no fighting to be done, to prevent it from supplanting the normal deliberative processes of civil government, and to prevent it from overriding civil liberty. To take these precautions is not to cast doubt upon the efficiency or the patriotism of our military leaders, but merely to recognize that it is not the job of the policeman to run the public schools or enact the city ordinances.

BULWARK AGAINST MILITARY GOVERNMENT

The student of history will recall that our strict subordination of military to civil authority stems, not from the arguments of political philosophers, but from the bitter struggles in England and America by which the people won their freedom from arbitrary and self-sustaining military power. The British Bill of Rights of 1789 contained a clause which placed the British Army squarely under the control of Parliament, and ever since that time the civil control of military power in England has been kept alive by the process of doling out for one year at a time, under the provisions of the Mutiny Act, the money necessary to keep the Army going.

When we came to establish our own National Government, the recollection was fresh in the minds of American leaders that England had sought to impose military government upon at least some of its recalcitrant American colonies. In spite of the fact that we came perilously near losing our War for Independence because our Army was dependent for support upon an inept and inefficient Continental Congress, the men who framed our Constitution made sure that the military power of the new government was safely subordinated to civilian control. A civilian officer, the President of the United States, was made Commander in Chief of the Army and Navy. Congress was given the sole power to declare war. Congress was also given the power "to raise and support armies," but with the express stipulation that "no appropriation of money to that use shall be for a longer term than two years."

These constitutional clauses have been supplemented by long-established governmental and political usage. Thus, with two or three exceptions in our long history, all of our Secretaries of War and Navy have been civilians. Congress, in appropriating money for the Army and Navy, has exercised important powers over military organization and policy, and every commission conferred on officers of the Army and Navy from ensigns and second lieutenants up to generals and admirals must be confirmed by the Senate.

Recent experience confirms the wisdom of this historic policy of keeping the military arm of the Government under civilian control. It shows that such control is necessary both for a sound management of public policy and for an adequate protection for the civil liberties of our people. It is a significant fact that during World War II, a war in which our national security was imperiled as it had never been before, the only major sacrifices of civil liberty which occurred resulted from military action. We have every right to feel pride and satisfaction in the generally wise and tolerant manner in which the Government dealt with the wartime problems of freedom of speech and press, the treatment of enemy aliens, and, with some qualifications, the handling of conscientious objectors. But few thoughtful people who know the facts will be able to escape a sense of national humiliation mixed with deep concern at the military evacuation of American citizens of Japanese ancestry from the west coast, and the long-continued military suppression of civilian government in Hawaii. I should like to comment briefly on these two violations of basic civil liberties, because in so far as they are typical instances of Army behavior they become gravely relevant to the question of what role the Army is to play in dealing with the new and more far-reaching problems created by the atomic bomb.

EVACUATION OF JAPANESE-AMERICANS

The main facts regarding the Japanese evacuation are now well known. Within a day or so after Pearl Harbor all Japanese and other enemy aliens previously ticketed by the Federal Bureau of Investigation as potentially dangerous were in custody. Full information about them had long been in the official files. Under authority of Executive Order No. 9066, of February 1942, General De Witt, Commanding General of the Western Defense Command, established Military Area No. 1, to comprise the entire west coast from Canada to Mexico to an average depth of about forty miles. Some 112,000 Japanese, 70,000 of whom were American citizens by reason of their birth in the United States, were compulsorily transferred from this area to relocation centers set up under the newly created War Relocation Authority, and detained there until the revocation of the exclusion orders in December 1944.

What this boils down to is the shocking fact that the Army took 70,000 American citizens, against no one of whom were any charges made of disloyalty or subversive activity, and locked them up in concentration camps for the virtual duration of the war.

The Army vigorously defended the evacuation program on the following grounds: Responsible military leaders believed that "the gravest imminent danger" to the public safety existed and that the exclusion of American citizens of Japanese ancestry from the defense zones was necessary both for their own protection against possible mob violence and in order to prevent espionage and sabotage. They reasoned that in so large a number of people of Japanese ancestry there must surely be some who were disloyal and dangerous, and that there was not time to try to separate the disloyal from the loyal. They denied that the evacuees were being punished, and insisted that the whole enterprise was a gigantic quarantine proceeding. Later, they made much of the fact that some American citizens of Japanese origin refused to swear unqualified allegiance to the United States and several thousand requested repatriation to Japan. They did not point out that these evidences of disloyalty cropped up *after* the compulsory evacuation, and at a time, therefore, when it must have been pretty hard for any of these 70,000 American citizens to feel any strong sense of patriotic devotion to a government which had deprived them of nearly every constitutional right which American citizens can claim.

It is true that the Supreme Court of the United States in 1944 held, six to three, that the evacuation program was constitutional. But the majority opinion of Mr. Justice Black does little more than declare that the evacuation was, in 1944, a fait accompli, and that it was too late to do anything about it. His argument, in substance, is this: The military authorities believed that there was grave danger to the public security. They believed that the evacuation of the Japanese-Americans was necessary to abate that danger. They believed that "the need for action was great and the time was short." In time of war we have to trust our military commanders. He concluded, "We cannot—by availing ourselves of the calm perspective of hindsight—now say that at that time these actions were unjustified."

PREJUDICE AT THE ROOT

But in "the calm perspective of hindsight" certain facts stand out which neither the Army nor the Court has explained away and which mark the entire proceeding as an abuse of power and an appalling violation of the constitutional rights of citizens. First, there is more than a little evidence that the long-standing racial antagonism against the west coast Japanese played its part in the drive to evacuate these American citizens. General De Witt, who ordered the evacuation, observed before a committee of the House of Representatives:

> A Jap's a Jap and it makes no difference whether he is an American citizen or not . . . I don't want any of them. We got them out. They were a dangerous element. The West Coast is too vital and too vulnerable to take chances. . . . You can't change [a Jap] by giving him a piece of paper.

Second, it is a matter of record that no instance of espionage, sabotage, or other disloyal conduct was discovered on the part of any Japanese-American, either on the west coast or in the Hawaiian Islands, during the war.

Third, the Army's contention that the mass evacuation was necessary because there was no time to determine which of the Japanese-Americans were loyal and which were disloyal will not bear scrutiny. The facts are that the first evacuation order was not issued until four months after Pearl Harbor, the last one not until eight months had elapsed, while the evacuation was not completed for eleven months. As Mr. Justice Murphy remarked in his dissenting opinion in the *Korematsu case,* "It seems incredible that under these circumstances it would have been impossible to hold loyalty hearings for the mere 112,000 persons involved—or at least the 70,000 American citizens—especially when a large part of this number represented children and elderly men and women."

MILITARY SUPPRESSIONS IN HAWAII

The second instance of military overriding of civil liberties during World War II occurred in the Hawaiian Islands. On the day after Pearl Harbor the Army set up military government in the Islands and took over all legislative, executive, and judicial functions. This affected not only the Japanese but all of the 460,000 people who live in Hawaii. The administration of criminal justice by the civil courts was completely blacked out.

Responsible military leaders argued that this drastic subordination of civilian affairs to Army control was necessary to the public security, but to the civil officers and people of the Territory it seemed a wanton and unnecessary denial of constitutionally protected civil liberties. It is now admitted that any active danger of the invasion of the Islands was effectively ended by the Battle of Midway in June 1942. It has already been stated that there were no known acts of sabotage, espionage, or other disloyal conduct by the Japanese or anybody else in Hawaii, either at the time of or after the Pearl Harbor attack. The civil courts of the Territory were ready at all times to perform their normal duties had they been allowed to do so, and experienced Federal judges testified that there was no good reason why any of the civilian criminal cases handled by the Army courts could not have been just as well or better handled by the courts of the Territory.

The bitter resentment engendered by this complete military suppression of civil government finally flared into a dramatic conflict between Federal District Judge Delbert E. Metzger and Lieutenant General Robert C. Richardson, Commanding General of the Central Pacific Area. Judge Metzger issued a writ of habeas corpus in the case of two American citizens of German origin who had been interned by summary military action. General Richardson disobeyed the writ and replied with an order specifically forbidding any judge in the Territory to issue a writ of habeas corpus. Judge Metzger thereupon fined General Richardson $5,000 for contempt of court.

At this juncture an emissary was sent from the Department of Justice in Washington to try to break the deadlock. A compromise was reached by which the President remitted the fine imposed on General Richardson, and General Richardson withdrew his order against Judge Metzger. It was agreed that writs of habeas corpus might be issued but that no prisoners would be released unless higher courts, on appeal, so ordered. This made it possible for a case to be started in the district court to test the validity of the military government. When this case came to the Supreme Court for review in February 1946, that Court ruled that the Army had exceeded its authority in suppressing civil government in the Islands. As a result, several military commanders are right now in the uncomfortable position of defending suits for damages brought against them for unlawful imprisonment.

While the Army was judicially spanked for its usurpation of power, the spanking came after the war was over and after basic civil liberties had been overridden for two years. The lesson from this is that while public danger can be real, it can also be a hue and cry under cover of which military government mows down the normal civil rights of the people.

CUSTODY OF ATOMIC RESEARCH

This all has a bearing on the problems we now face arising out of the atomic bomb. It is natural that military men should regard these as military problems, just as the development of a new type of submarine or airplane would create military problems. New scientific discoveries, especially in the field of destructive weapons, vitally concern the public security of this Nation as well as every other nation. Heavy responsibilities in connection with the atomic bomb must and should rest with our military leaders. We shall need to depend upon them for expert advice as never before. On every question which concerns the national security they must be consulted and their judgment must carry the greatest weight.

If study of this problem, however, has made anything clear, I should say that it is that the atomic bomb, with the whole scientific development of which it is a part, presents very much more than a military problem. It has presented a challenge to virtually every field of human thought and activity, and it calls for statemanship of the highest order to deal wisely with the new problems which it has created. This is why the responsible leaders of the Government—the President, the Chief of Staff, the Secretary of War, and many others—have demanded that the control of atomic energy be placed in the hands of a civilian commission with power to write the basic policy for its use and development.

There is a strong counterdrive in progress, however, which seeks to turn the whole matter over to the Army and Navy on the ground that only the military branch of the Government can safely be trusted with problems so vitally affecting the national security. I have already mentioned Congressman Rankin as one of the spokesmen for this other school of thought. He is joined by members of the Committee on Un-American Activities, the House Committee on Military Affairs, as well as other members of Congress, and many officers of the Army and Navy.

CONSEQUENCES OF MILITARY CONTROL

I shall not comment on the success with which the military would be likely to deal with the broad issues of domestic and foreign policy which the development of the atomic bomb has created, although such a prospect is not reassuring. I do wish to suggest, however, that to the extent to which we leave the military in control in this vitally important area, to that extent we may reasonably expect the following restrictions upon civil liberty.

First, the military is of necessity the great apostle of the doctrine of secrecy. But from the military point of view, to be sure of secrecy means—don't tell anything. With the Army in control of the atomic energy question, any free flow of information in that field will end. No one will deny that secrecy is essential in handling security problems, and no one desires irresponsible gossiping about matters which concern the national safety. But neither reason nor experience indicates that military judgment on the sound limits of secrecy in the field of scientific investigation is likely to be as trustworthy as that of a responsible civilian group. It would be calamitous to shut off the broad and free discussion of the basic points involved, since it is only by such free discussion that we can hope to increase our wisdom and inform public opinion with respect to the vital questions of policy which must be faced.

A colleague of mine in a great university whose scientists had been actively concerned with the work on the atomic bomb related this incident: One of these scientists, a man of national repute, accepted an invitation to give a popular talk on uranium to a Rotary Club or chamber of commerce, or some such group. Now uranium was discovered in 1789 and there is no chemist in the world who is not familiar with it, although many laymen would now be glad to know some of the general facts about it. Suddenly, this scientist received a message the essence of which was, "The War Department does not wish any public talk about uranium." The scientist explained that he was planning no disclosure of any atomic bomb secrets, or anything else except the most obvious and innocuous information. The response was, "The War Department does not wish any public talk about uranium." And that was that. Can there be any doubt that this attitude is what we must expect if the Army is put in control of atomic developments? And secrecy and censorship are archenemies of civil liberty.

Second, military control of atomic energy development would mean that our scientists would have to work under restrictions imposed by military authority. Perhaps the scientists would not mind. Perhaps the restrictions would be wholly reasonable. Perhaps there would be no restrictions. But experience points in the other direction. Professor Harold C. Urey, of the University of Chicago, a Nobel Prize winner and one of the key men in the development of the atom bomb, has made entirely plain his own attitude toward this situation, and he speaks for many of his colleagues. He asserts that at present the top-flight men in the field of science are not working on the atomic bomb, because "good men simply will not work on the atom bomb the way the Army wants them to." He added, "At least a civilian commission wouldn't throw out a competent scientist just because it didn't like him, which is what the military did." Complete freedom of scientific research is a national asset which must be guarded and nurtured if we are to retain our position of world leadership, and that sort of freedom apparently does not flourish under Army supervision.

Third, the Army insists that those under its authority in positions of responsibility pass the most rigid scrutiny of their loyalty to this country. This is of course necessary and desirable. We cannot allow spies, traitors, or others of dubious reliability and patriotism to occupy these key posts, or any others. But unfortunately the Army has complicated this problem by including in its examination of a man's loyalty a scrutiny of his political and economic views and his social philosophy. I do not mean that it distinguishes between Republicans and Democrats, but it appears to be generally guided by the standards set up by the Dies Committee (which I shall speak of later) in determining whether a man ought to be regarded as a dangerous radical, and therefore subversive. The commission of a former student of mine, specially trained for intelligence work in the Army, was held up for months because after painstaking scrutiny it was discovered that he had married a girl who, while in college, had belonged to the American Student Union.

It is quite clear that Army authorities intend to exclude from participation in atomic energy work scientists whose liberal social and economic views might lead the Army mind to regard them as either suspect or actually dangerous. If one of our nuclear physicists is found to have expressed sympathy with the Spanish Loyalists back in 1939 or 1940, there is every indication at present that the military authorities, were they in full control, would bar him from participation in atomic research.

It seems reasonable to conclude, therefore, that if the atomic bomb and its aftermath lead us, on grounds of national security, to vest control and responsibility in the hands of the Army, then we are inviting a substantial and continuing curtailment of freedom of thought, freedom of discussion, and freedom of scientific investigation. Military control and civil liberty do not live comfortably together in the same house.

REVIVAL OF WITCH-HUNTING

The second major threat to civil liberty resulting from the atomic bomb takes the form of a revival of witch-hunting on a broad level. There is grave danger that the fear complex engendered by the atomic bomb may produce this result, and there is some evidence that it is already doing so. It will call for a good deal of organized levelheadedness and sound leadership to avert this result.

As is well known, official and organized witch-hunting in this country on a national scale is in the hands of the Committee of the House of Representatives on Un-American Activities—the so-called Wood-Rankin Committee—the successor to the old Dies Committee. There are, of course, other agencies which supplement the work of this committee; but since the Committee on Un-American Activities is the most powerful and conspicuous witch-hunting body, and seems to take the greatest pride in its work, I shall comment briefly on its philosophy and its methods.

The Committee on Un-American Activities was set up in 1938 for the purpose of providing Congress with such information with respect to subversive and disloyal persons and movements at work in this country as might aid Congress in passing legislation. The Supreme Court has repeatedly declared that the only constitutional justification for the exercise by a committee of Congress of inquisitorial powers is to further the legislative process. To search for treason or disloyalty for the purpose of punishing it is a power reserved to the executive branch of the Government, and a power which is efficiently exercised by the FBI.

In fairness to the committee, it should be stated that it did in its earlier days uncover facts regarding the German-American Bund and one or two other organizations with results which were useful, although it seems fairly obvious that these facts would have been discovered by the FBI in the course of its normal routine activities. But under the leadership of Mr. Dies, and under the present leadership of Messrs. Wood and Rankin (and principally the latter), the committee devotes its energies almost exclusively to discovering and harassing persons and groups whose political, social, and economic views may be generally classified as liberal-to-radical. Roughly speaking, this includes almost anyone from a New Deal Democrat to the admitted Communist.

LIBERALISM IS UN-AMERICAN

Those whose views and activities lean toward fascism, or who support the principles of dictatorial exercise of governmental power, do not seem to worry the committee except in very, very extreme cases. Thus, sympathy with the Spanish Loyalists (who received support from Moscow) brings one squarely within the committee's range of suspicion and disapproval, while support of Franco (who was supported by Hitler) does not. On the other hand, opposition to Franco at too early a date will place one on the black list because it shows one to be guilty of "premature anti-fascist activity." When the suggestion was recently made that the committee should investigate the activities of the Ku Klux Klan, which is beginning to raise its ugly head again in various parts of the country, the chairman of the committee remarked jovially, brushing the idea of investigation aside as absurd, that the Ku Klux Klan "is an old American tradition, like illegal whisky-selling." And with that, the committee turned its attention to the investigation of the National Council of American Soviet Friendship, which lists among its formal sponsors dozens of liberal leaders; an organization whose work has been highly praised by President Roosevelt, President Truman, and General Eisenhower.

One is forced to the conclusion that the only thing which constitutes "un-American activity," in the view of the committee, is the holding and public statement of social or economic views which fall in any way to the left of center, and of which the members of the committee therefore disapprove.

CRITERIA OF DISLOYALTY

We do not have to guess about the methods of the Committee on Un-American Activities. They have been a matter of public record for eight years. Let us examine them briefly. First, the committee in passing judgment upon the loyalty of individuals and groups is using as its criteria descriptive terms so broad and general as to be practically meaningless. What is a communist? There is no generally accepted definition. The Federal statutes do not use the word communist. In the Sedition Act of 1940 Congress certainly had communists in mind, along with others, when it imposed its ban on those who advocate the overthrow of government in this country by force and violence. But the Committee on Un-American Activities has never been content with that narrow definition of a communist. In fact, if we are to believe Mr. Rankin, who is now the guiding spirit of the committee, anyone who favors the Fair Employment Practice Committee or who wishes to see the poll tax abolished in the South is a communist.

It is obvious that the word "un-American" has as many meanings as there are people trying to define it. When Congressman Wood succeeded

Mr. Dies as chairman of the committee he sent questionnaires to a large number of people asking them to state what the word "un-American" meant to them. The results were as diversified and inconclusive as Mr. Wood should have known that they would be. And so one might go down the line with the rest of the committee's vocabulary, which includes the words "subversive," "red," "pink," "fellow-traveler," "front organization," and others. All of them are words into which may be read almost anything in the way of social, economic, or political opinion which the members of the committee do not happen to like.

GUILT BY ASSOCIATION

In the second place, the Committee on Un-American Activities has perfected and uses continuously the vicious principle of guilt by association. It is, of course, true that if a number of people conspire together for an unlawful or otherwise objectionable purpose, then they are fellow conspirators and are equally guilty. This is not what I am discussing. The committee has proceeded on the theory that a man who is a communist, who is "subversive" or "un-American," is afflicted with a contagious disease which inevitably infects all persons who in any way come in contact with him, associate with him, or share any of his ideas even though they are not the subversive ones. This is what the committee means by a "fellow-traveler." Let a person belong to an organization in which there turn out to be some communists; let him sign a petition favoring some public policy which may also be supported by some communists; let him express sympathy with the Spanish Republicans, some of whom were communists; let him express strongly his admiration of Russian culture and achievements; any one of these things will brand him as a "fellow-traveler," a dangerous fellow who is seeking to bring about the establishment of communism in this country.

It was only by this sort of nonsense that Mr. Dies was able to complete the grotesque lists of men and women who were advertised to the American people as being unpatriotic and subversive. On those lists, among thousands of others, were the names of Eleanor Roosevelt, Lillian Smith, Gifford Pinchot, William Allen White, Heywood Broun, Leon Henderson, and Archibald MacLeish.

It is reassuring to find the Supreme Court speaking its mind on this important matter of guilt by association. In the recent case involving the deportation of Harry Bridges, one of the points which was necessary to the Government's case was a showing that Bridges was "affiliated with" certain organizations which advocated the overthrow of government by force and violence—to wit, the Communist Party and the Marine Workers Industrial Union. There was ample and undisputed evidence that Bridges had accepted the aid of these organizations and had worked with them in order to strengthen the position of the labor union of which he was the head. The Court held that "affiliation" with an unlawful organization meant only association or co-operation with it in its efforts to carry out its unlawful purposes, but that

> one who co-operated with it in promoting its legitimate objectives certainly could not by that fact alone be said to sponsor or approve of its general or unlawful objectives. And unless he also joined in that unlawful program, he would not be "affiliated" with the Communist cause in the sense in which the statute uses the term.

In other words, good boys may associate with bad boys in order to do good.

UNFAIR PROCEEDINGS

A third characteristic of the methods

and procedures of the Committee on Un-American Activities is its complete indifference to the question whether or not its findings and accusations are correct. Its hearings have from the beginning been *ex parte* proceedings in which those under investigation are not represented by counsel, and are allowed no opportunity to answer charges against them or even to know the source of the charges. They are not permitted to introduce witnesses or evidence in their defense. The situation is very much the same as if a grand jury indicted a man for crime, published in the newspapers the charges in the indictment in such a way as to give the impression that they were all true, and then allowed the accused no opportunity to deny the charges or to have a fair trial.

In 1942 Mr. Dies released to the newspapers a statement in which a number of government officials were charged with being dangerous and subversive persons, among them a man named Vaughan. Now there were two Federal officers named Vaughan, and Mr. Dies named the wrong Mr. Vaughan. The object of his erroneous attack promptly brought a $75,000 libel suit. Mr. Dies admitted the error and apologized publicly. But what a commentary on the procedure of the committee that such a blunder could be possible under any circumstances whatsoever! The committee had not even taken the trouble to make sure it had the right man before it publicly branded him as a disloyal citizen.

A MENACE TO FREEDOM

I have discussed the Dies Committee in this much detail because I believe that the committee has always been a menace to civil liberty, that in this atomic age it will be an even greater menace to civil liberty, and because it is also an actual, though doubtless unintentional, menace to the national security. And I should like to repeat that I am using the committee simply as the best concrete illustration of a point of view and a method of which there are many less conspicuous and less influential exponents.

In the first place, the committee has from the beginning been a menace to civil liberty in this country for two reasons. It has directly threatened and suppressed free speech and a free press by pinning official stigma on the free and open advocacy of liberal social and economic views, and the banding together of people to further the adoption of liberal programs of action. It has also dangerously undermined civil liberty by the subtle corruption of public opinion. By its steady insistence on the idea that it is un-American to criticize the status quo or propose social and economic reforms, the committee has persuaded thousands of good loyal American citizens (and unfortunately there are many who do not need much persuasion) that the suppression of freedom of speech and press is a patriotic enterprise, and that witch-hunting, like the Ku Klux Klan, is "an old American tradition." It has made bigotry and intolerance respectable.

In the second place, this normal threat to civil liberty which results from witch-hunting is going to be enormously increased by the development of the atomic bomb. This is true because we are, very reasonably, frightened by the implications of the atomic bomb; because our present national policy is to maintain the most rigid secrecy with respect to the atomic bomb; and because the nation which we are most anxious to keep from sharing our atomic bomb secrets is Soviet Russia.

This presents a situation made to order for the witch-hunters. There are millions of patriotic Americans who do not forget that Russia was a valiant ally in the late war. They have a very genuine admiration for Russia. They are not communists; in fact, most of them probably have no very clear idea of what communism really is. They merely respect a great nation for its achievements and its many admirable qualities. They hope that our relations with Russia will be friendly. They feel, further, that humanity's best chance for peace lies in the friendly co-operation of all the nations of the world through the agency of the United Nations or some similar organization. But already the Wood-Rankin Committee is beginning to tell us that spies and traitors lurk behind practically every bush; that the National Council of American Soviet Friendship, which I have already mentioned, is a "front organization" seeking to deliver us into the hands of the communists; and, in short, that any one who has a friendly word to say about Russia ought to be shadowed and investigated.

Mr. Adamson, the chief investigator for the committee, who will go down in history as the man who discovered that it is un-American to call the United States a democracy, filed in the spring of 1946 a "preliminary report" on "an investigation concerning subversive activities, at or in connection with, the operation of the government reservation known as Oak Ridge, Tennessee." He found that the scientific and engineering personnel at Oak Ridge had formed one or more scientific societies. He found that "the activities of these societies are devoted to the creation of some form of world government," that they actively support "the international civilian control of the manufacture of atomic material," that "these societies are definitely opposed to Army supervision at Oak Ridge and are just waiting for the day when military administration will be thrown out," and that "the society officers . . . not only admit communication with persons outside the United States but in substance say that they intend to continue this practice." Mr. Adamson then stated that "the security officers at Oak Ridge think that the peace and security of the United States are definitely in danger," a statement promptly repudiated by the security officers. Mr. Adamson brought his horror story to a climax by announcing, "One of the most surprising comments was an expression from a young scientist to the effect that the power of the atomic bomb was much greater from a political viewpoint then from its physical aspect."

All of this would merely be ludicrous if it did not so clearly indicate a fanatical zeal to establish a form of "thought control" with respect to the whole atomic energy program by branding as subversive and potentially traitorous any individual with the temerity to suggest that anyone except Army officials may properly discuss the social and international implications of atomic energy or be given the power to deal with those problems. Perhaps we ought to be grateful to Mr. Adamson because he does make witch-hunting ridiculous, but the forces which he represents are powerful and are in earnest, and the danger of an increased suppression of civil liberty as a result of the fears engendered by the atomic bomb is very real.

THE GOAL LOST

A third indictment against the kind of witch-hunting which I have been discussing is that it constitutes a direct and serious threat to the national security. It defeats the very purpose for which the Committee on Un-American Activities professes to exist. There can be no doubt that there are in this country dangerous and subversive persons and groups who are bent upon the destruction and overthrow of our institutions I should be glad to see these people either in jail or deported. Their infiltration into many useful and patriotic organizations is a grave menace to our security. We have laws for dealing with these people, and fortunately we have an efficient FBI to run them to ground. To deal with them effectively calls for statesmanship and efficiency of the highest order.

But the Committee on Un-American Activities for eight years, like the boy in the fable, has been crying "Wolf, wolf!" Time after time we have received the startling announcement that the committee has discovered the men whose subversive activities are destroying our American form of government, and when these dangerous villians are identified they turn out to be Robert Morss Lovett, Harry Hopkins, Henry Wallace, Albert Einstein, Bruce Bliven, and others of the same character. We are in danger of losing our capacity to be really alarmed. We have been fooled too many times. It has long since ceased to be any disgrace to be on one of the committee's numerous lists of so-called subversive and dangerous radicals; on the contrary, one finds himself in the most respected and distinguished company. Who would not prefer to have his name coupled with that of Mr. Ickes, Justice Murphy, or Justice Frankfurter than with that of Martin Dies or John E. Rankin?

The committee apparently does not know the difference between a dangerous man and one who is not; it has been busily engaged in confusing public opinion with respect to that difference, and in consequence we have created a wide zone of safety well inside the limits of public respectability within which genuinely dangerous persons bent upon the overthrow of this government may wander about with comparative freedom and immunity. They are in such good company that we fail to identify them.

In conclusion I should like to suggest that if this Nation and the world are to survive in the atomic age, it will be because we find ourselves able to draw collectively upon all the wisdom, the statesmanship, and the good will of which we are capable. Those are not qualities which thrive under a regime of military domination, or in an atmosphere of intolerance, or under arbitrary restraints which will fetter full and free discussion among men. We say glibly that man's first concern is to survive. During the past four years we have all had a lesson in how precious it is to us merely to be alive. But is it not true that we fought the war at a heavy sacrifice of life because we wanted to live *in freedom?* The atomic bomb has brought us fear, just as Hitler brought us fear; and fear is a calamity just as war is a calamity. One of the questions which the bomb poses for us is whether our security is more important to us than our freedom. But if the war taught us anything, it taught us that life without freedom has lost its value. Our chances of preserving the world we so lately fought for seem to me to be in direct ratio to our ability to keep alive those freedoms of thought and discussion without which democracy cannot function at its best.

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Total War and the Preservation of Democracy

By Arthur W. Bromage

WAR is a grim business and has profound effects upon public administration. Even in the United States, which was preserved from invasion, the war had a real impact upon our Federal, state, and local governments. In war areas, once military government begins to control occupied territory, it is soon evident that administrative reconstruction as well as physical rebuilding must be undertaken.

In a future made precarious by the atomic bomb, we shall have one little world or no world. All-out preparation for total, atomic war can have a profound effect on our democracy. Peace can give us the opportunity to perfect our democracy. Accordingly, three questions are submitted for consideration. First, what has happened to democratic government in the United States from 1888 to date? Second, what happened to democracy in Germany as a result of dictatorship followed by a war of aggression in which Germany was defeated on her own soil? Third, what are the prospects for the preservation of democracy in the United States in the atomic era?

Democracy in the United States

War or no war, the touchstone of government in the United States continues to be the extent to which its character is democratic. Old-school political scientists operate on the theory that local self-government is indispensable to democracy. A classic statement of this is in James Bryce's book, *The American Commonwealth*. It was the assumption of our English observer that Americans had something unique in the sweep and force of local self-government. Its solid base was essential to the strength of American democracy, but the flaw in the democratic system, according to Bryce, was to be descried in the abuses which had sprung up in the cities.[1]

Since Bryce delivered this opinion in 1888, simultaneously praising and admonishing the local communities, they have felt the pressure of increasing centralization in the United States. The Federal Government of necessity in our complex civilization now has a hand in everyone's affairs from sugar rationing to employer-employee relations. The state governments are increasing rather than decreasing administrative control over cities and counties. Home rule for cities no longer carries the emotional appeal which it had in the twenties. Municipalities are struggling to stay afloat financially; forced to beg from state legislators more state-collected, locally shared taxes, extra grants-in-aid, and additional legal authority to levy diversified local taxes other than the property tax.

Modern City Management

Before World War II, American cities had gone a long way to rebuff Bryce's charges. Bossism, the shame of the cities so ably portrayed in 1904 by Lincoln Steffens, is not entirely a lost art in American communities, but bossism has long been on the wane and professionalism in municipal administration is on the make. Witness the relatively rapid growth since 1914 of the council-manager plan of administration, which is a streamlined operation from public to representative council to management. At the end of 1945 some 637 cities had professional managers employed by councils to direct and control their administrative mechanisms. Furthermore, the strong-mayor form of city administration has taken the edge off bossism in larger cities. Instead of Tammany Hall, New York has had many years of La Guardia.

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[1] James Bryce, *The American Commonwealth* (London, 1888), Vol. III, pp. 360–61.

The International City Managers' Association forms a professional core for all managers who are interested in the advancement of their skills and know-how in administration. Municipal officers have formed into professional associations such as the Municipal Finance Officers Association, dedicated to the improvement of their own and their communities' professional approach to the problems of today and tomorrow. Certainly, in the field of municipal administration Bryce would now have to give us aces and spades instead of the deuces and treys which he dealt out in the first edition of *The American Commonwealth*.

It is not only in the field of over-all management that cities have advanced. They have moved forward on a broad front in such staff functions as finance and personnel administration, planning, and research. Services have been extended outward; police and fire administration, public health, public works, and public utilities have expanded to meet increasing local demands. This administrative and political evolution has taken place, for the most part, in peacetime and without the direct interference of enemy action.

RURAL GOVERNMENT

In American rural government as contrasted with municipal life, progress has not been so noticeable. Constitutional limitations and electoral distrust of county home rule have hampered the growth of county-manager systems. Rural administration has improved piecemeal. The elective county sheriff has in some areas taken to two-way radio patrol; health units have been organized; office techniques have undergone modernization. However, integration of functions through over-all management is still lacking except in California, Montana, New York, North Carolina, and Virginia, where a few counties have adopted manager or semi-manager plans under home rule powers or optional state laws.

Generally speaking, we still lack at the county level an executive head, either popularly elected or appointed by a representative council. County government rests in the Jacksonian tradition of the short-term, popularly elected administrators of specific staff and line services. Sometimes a substantial administrator emerges from this process, but only sometimes. Appointment, provided the chief executive is on the side of picking administrators with a professional look in their eyes, is normally a surer process.

Although there was a time when it seemed that the township, particularly in the Middle West, was about to shrivel up and blow away, political institutions have a vitality which gives the lie to theorists in political science. The township is still with us, although its utility has diminished. Like the one-room school district, it seems to satisfy the basic psychological need of rural and suburban residents for one instrument of government on which they can literally lay their hands. You can get your hands on the township officials more readily than you can lay them on the representatives or administrators at the state capitols or in Washington, D. C. Nevertheless, township roads in some states have gone over to county road systems, and public health needs have risen to the level of the county health unit.

While they have in a sense given ground to Federal and state centralization, American communities, urban and rural, are still as indispensable to us as they were in Bryce's eyes. It is true that the Federal Government has enhanced services, and, through a more extensive use of the commerce and taxing-spending powers and policies of grants-in-aid and administrative controls, has reinforced the web of public administration. It does not follow that for every addition by the Federal Government there is a subtraction at the state and local levels. The social security policies of the Federal Government, for example, promote public administration by state and local units.

This is what happens under "normal" conditions in a country that has not known dictatorship or enemy action. What happens to intergovernmental relationships in a country disrupted by dictatorship, defeated in arms, and ultimately occupied is quite a different story.

BOMBED OUT

What happens when war sweeps over an area and public administration is gone with the wind? I have in mind, partly, Bavaria in the spring and summer of 1945. If the area has had a highly centralized system of public administration with authority issuing down from the top, a number of things happen. Let us assume an area with four levels of administration: central; state; administrative district; and local including city and county with subordinate townships within the county. Communications are shattered; postal services, telegraph, and telephones are out; railroads and motor transport are immobilized. Central governmental control is highly dependent on this postal, wire, road, and railroad net. Orders cannot circulate out to the periphery without communication lines, and personnel cannot move back and forth without transport. One cannot do much on a bicycle. Correspondingly, the outlying communities are powerless to report back, to apprise central authorities of local conditions, to request instructions, to obtain any over-all estimate of the disaster. Functioning in the dark, the individual community has to meet and solve whatever it encounters on the spot. It is first aid in public administration.

Beyond the physical disruption, the national ideological conflict causes top administrators in the higher echelons of government to take it on the run, to disappear, to melt away. The top-level political official knows that his day is done and that he must choose his own way out from among a variety of methods: death, flight, or loss of identity. Whatever he does, he is not at his administrative post. Subordinate officials take their cue from him. Political and administrative disintegration spreads down into the routineers.

Nor is this disintegration confined to any one layer of government. It appears in the state, the administrative district, and, to a lesser degree, in the local community. Policemen, firemen, public utility engineers, finance officers, clerical and subordinate personnel may stand fast either out of an overpowering sense of public duty to the community or out of a lesser involvement in the ideological implications. The higher the administrative headquarters in the chain of public administration, the more chaos and confusion will prevail. Conversely, the lower the level of public administration, the greater retention of administrative structure and personnel there will be.

LOCAL GOVERNMENTS FUNCTION

I have seen an area—the State of Bavaria—including five administrative districts and some 160 cities and counties in which administration was reduced temporarily to what the local governments could do for approximately ten million people—subject, of course, to military control. This is not to say that all evidences of centralized administration were obliterated. Tag ends of the former central system were available. For example, officials and employees of a railway division or of a central financial district for the collection of taxes remained on duty. Such administrative outposts of the central government had to be restored gradually, sometimes under state supervision.

DESTRUCTION OF A CITY

How does the community, urban or rural, react under these circumstances? Assume a city of some 750,000 population. What do we expect to find when the bombings have ceased? The heart of the city is destroyed. There may be buildings or walls of buildings standing here and there, but near the railroad terminals, factory areas, and in downtown sections, rubble is all that is left of once busy lanes of traffic, producing industries, loading docks, tracks, and shopping marts. Trams are not running. The local gas works are either flattened or not operating for lack of coal. Electric current may be nonexistent, sporadic, or fairly stable—it all depends. Water supply may still be available, but breaks in the mains will have necessitated cutting off areas to avoid great wastage. Sewer lines have hundreds of major breaks. Telephones are out, either by act of war or by order. There is no postal service. Street cleaning and garbage collection have become unknown luxuries.

No traffic police are around except the military. Few civil police are on duty and they wear civilian clothes with arm bands furnished by the occupying authorities; but they carry no arms. Even while they work, they are being screened by ideological standards which exclude those who were members of the Nazi party or its organizations. The fire department may have equipment still intact, but its personnel must also be examined on political adherences.

The populace, if it still has food reserves, cooks over ranges or open fires, or not at all. There are long queues before the food shops and whatever supplies there are fall under ration tickets and price control. The banks are closed and for once no one is worried about the payment of taxes, except the newly appointed municipal administrators. Public health and public welfare are crippled by lack of personnel and finance.

Education has come to a dead stop. Buildings are destroyed, damaged, or otherwise occupied; children and teachers are dispersed to the country; textbooks have become politically archaic. It takes a long time to reconstruct a school system once it is disordered. There are more problems than those concerned with the ideologies held by teachers and expressed in books. Obstacles as to structures, fuel, and transportation must also be surmounted.

The individual accustomed to a socialized, urban administration finds that his city is one in name only. Energized action so necessary to rebuild administrative processes and physical facilities is hard to find.

CIVILIAN REACTION

The first reaction on the part of the civilian is apt to be one approaching anarchy. The norms of authority and the usual restraints having disappeared, this is the moment for one to save what he can. This response may take the form of looting for food and valuables, moving in on someone else's premises where they stand vacant, seizing elementary forms of transport such as bicycles or carts. Nothing matters any more. The whole sense of the ordered, integrated community has been lost.

This is especially true in areas where centralized authority and control have had long arms down into local life, where everything has been ordered and regimented. Unless one has seen local administration stop and flounder until life is breathed into it again, he cannot realize how pervasive municipal administration is to life and daily being.

Shortly, the old awe of authority is transferred from the washed-out central civilian authorities to the new military units who have a physical embodiment in the local military government headquarters and who, it is soon discovered, mean business about curfew violations, ideological intransigence, and disorder generally.

RECONSTRUCTION BEGINS

This is where the resilience of localism manifests itself. The sense of the community is intensified rather than diminished. People straggle back to a bombed-out town, putter around in the ruins, build a hovel close to or on the site of old home-rubble, set up makeshift shops, dig for buried treasures, and look to emergency administrators to bring a gleam of hope and some semblance of order out of local chaos. Wherever a town is suddenly destroyed, people try to rebuild on the ruins. Given half a chance, they will go back and begin all over again.

The people are so dazed at first that they do not even make minor repairs to their own damaged buildings or "scrounge" wood from bombed-out areas. But this phase passes and is succeeded by the urge to individual and group survival. The state of bewilderment disappears and slowly the process of repair in a crazy-quilt manner begins. The struggle for food is primary. Long hours must be spent in queue lines, or resort may be taken to black-market deals. Search for shelter and warmth are close seconds. Usually enough clothes have been saved to provide some kind of protection for the body.

The city, like the human being in this raw situation, is confronted with the problem of putting first things first. Security must be re-established. The police and fire departments must be reorganized as to personnel and, in so far as possible, as to equipment. Water supply must be restored, and the sewer system must be repaired with all possible dispatch. The local gas works, if coal can be obtained, must be put into operation. The supply of electricity must be maintained. Here the city is often dependent on private or public utilities which serve more than the local area, and another level of administrative authority has to be called into play. The streets must be cleared to permit two-lane traffic, if possible, although sometimes a one-way street is all that can be managed. All this requires trucks and gasoline as well as personnel. The debris has to be disposed of, and it may be necessary to dump it on low land in public parks. Hospitals must be put into operation at all costs. Public health and welfare workers must be pulled back into the stream of administration to guard against epidemics and social disorder. Then comes the more tedious task of re-creating fiscal and administrative bodies of all types.

However, none of these steps proceeds in any nice, chronological sequence. The military government is in command and mobilizes local action. Under the control of the military, the community must pull itself up by its own bootstraps. First things first, to be sure, but there are a number of first things, and many of them must begin simultaneously in a sort of administrative rush and onslaught. Ultimately, the first tramcar meanders down cleared tracks with current in repaired over-head lines. The city has begun to tackle its problems.

CENTRALIZED ADMINISTRATION NEEDED

Gradually, even after local services are set in motion, it becomes apparent that the community is still not a community. One really does not have a community in modern administration until there are banks, taxes, pay rolls, postal service, telephone, and telegraph. Intercommunication with other cities by post, telephone, railroad, and motor transport must be re-established. Much of this comes slowly and is dependent upon re-establishment of the higher echelons of public administration. The question of local taxes and disbursements is so intricately linked with higher administrative policies that communities can only temporize in these fields. The same thing is true of a system of food rationing and distribution and price control. The city is dependent on rural areas for food supply and on higher commands for policy as to rationing, distribution, and prices. In time of crisis, this fact is magnified.

The postal system can be re-established locally within a city. This assists in local administration and provides a necessary service to residents. However, the central mechanism of the post and intercity operations are soon required. People no longer live in walled cities, and families and interests are dispersed over wide areas, particularly in war. Government-owned telephone and telegraph systems respond to nerve centers of administration higher than the city. Here again control must reach up and come on down the line. The railroads are another indication of higher administrative procedures. It is not coal or current alone that makes the wheels go around so far as the government-owned railroad is concerned, but bureaucracy as well.

Generally speaking, the rural county, village, and township come off better in modern war than the congested urban area. Of course, many local rural communities are pulverized because they happen to lie in the path of a campaign where resistance is encountered. Yet, the villages and the countryside are more likely to escape. Their administrative problems are less acute. Food supply is closer at hand. Shelter is proportionately less damaged. Less intricate administrative machinery is less susceptible to injury. Security problems are less intense, except where outside elements infiltrate and bands commit depredations. Sanitation is a less complicated problem.

This, in brief, is what happens to the governmental machinery of a country lured into aggression by dictatorship, defeated in arms on its own soil, and ultimately occupied by force.

LOCAL SELF-GOVERNMENT THE TEST OF DEMOCRACY

Just as peace is indispensable to humanity, so is local self-government indispensable to democratic society.

The preservation of local self-government is the test of democracy. Public service in the city and the county provides a training school of democracy. The voter faces issues close to his domestic interests. It is no secret that Mussolini and Hitler made inroads upon the Italian and German systems of local government. Each introduced major changes in local administration so that it was shackled to centralized administration and made an instrument of dictatorship. Neither Mussolini nor Hitler could tolerate local self-government as we know it, or even to the extent that the Italians and the Germans had known it before totalitarianism eclipsed the world. Mussolini introduced the centrally appointed podesta for the Italian commune. Hitler developed appointive and advisory city councils to replace the formerly elected and power-possessing local bodies. Dictatorship and local self-government do not mix.

In our American way of life, local self-government in the tradition which Bryce observed has survived. It has survived the era of bossism in the cities and modern trends toward Federal and state centralization. It has been a force in the preservation of our democracy. Not only has it been a training ground for citizens, it has also been a school for elected officials and appointed administrators. Talents developed at the local level become available for state and national administration. Our state governments provide seedling beds out of which national officials and administrators are developed. In the broad sense, state governments as well as the city and county units are part of this training school of local self-government.

PRESERVATION OF DEMOCRACY IN AN ATOMIC ERA

Assuming that an era of planned, organized, and enforced peace lies ahead, most important to us in the United States is the continued application of citizen intelligence to the art of local self-government and to the building of better-planned and better-administered communities. The county can be overhauled administratively; the council-manager plan can be extended from city to city. Federal-state-local relations can be made more scientific and less haphazard, as in the fields of taxation and grants-in-aid.

DEMOCRACY AND TOTAL WAR

Can we maintain democracy and at the same time prepare for total atomic war? The fate of our civilization rests in the capacity of the social sciences to keep pace with the incredible developments in the physical sciences. In proposing the creation of an International Atomic Development Authority before the Atomic Energy Commission of the United Nations during June 1946, Bernard M. Baruch stated: "We are here to make a choice between the quick and the dead. This is our business."[2]

At this time, it remains to be seen whether an adequate system of international control of atomic energy, including the renunciation of the bomb as a weapon, can be put into effective operation. That such a course is desirable, provided the conditions laid down by Mr. Baruch are met, no sane man would dispute. If the course of history is otherwise, and armament races of the future are to enter an atomic phase, the best the political scientist can offer will be of little avail. What there is to offer seems negativistic in character and designed for some degree of national self-preservation.

If we cannot assure ourselves positively and permanently that there will be no more war, it follows that American communities will—in this atomic era—lie within the danger zone. One obvious consideration seems to be the decentralization of public administration.

DECENTRALIZED ADMINISTRATION

For emergency purposes, a plan for an appropriate number of Federal-authority centers is needed, each center to be endowed with a bureaucratic complement to carry on Federal civil functions in a given regional area. Each one of these regional areas will require a single administrator, responsible for carrying on administratively in his area even though completely cut off from all other Federal-authority centers and from Washington. The Federal-authority centers should have an emergency standby staff with some training to assist, and to replace where necessary the casualties suffered by the staff originally assigned to duty.

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[2] *The New York Times*, June 15, 1946.

The industrial states of the Union have a similar responsibility to think in terms of geographical dispersion into multiple operating centers within their boundaries. If an emergency period arises, a plan of dispersal of administrative staffs should be put into operation with a complete alternate administrative mechanism for specific areas in the event of their being cut off or so badly hit as to need state services immediately available and in place.

Protection of our local communities requires a broader plan of civilian defense than that which was organized during World War II. This organization never had to stand the test of actual defense operations, although it would certainly have acquitted itself well. In other words, in total war the best chance for survival lies in a strong system of local self-help and in all sensible precautions for the maintenance of Federal and state civil authorities capable of command and co-ordination. Established relationships with responsible professional officials are essential to volunteer performance in an emergency at the local level. Planning and action for the maintenance of Federal and state administrative nerve centers are essential to continued performance in their respective spheres of authority.

ADVANCE PLANNING

All levels of government must be concerned with the possible evacuation of population. It is easy to say that in event of emergency, all city residents who are not essential should get out. But how, when, by what means, and where to? This means advance planning of assembly, transportation, reception at destination, and temporary resettlement. It will strain the shelter and feeding capacities of the receiving areas unless emergency food stocks and shelter have been prepared in advance. Railroads, road transport, and walking are the only known methods to date for the dispersal of large masses over wide areas. This calls for prearrangement to obviate mass movement without sense of direction. What the privately owned utilities should do is still another phase. Even officialdom in this country depends on an elaborate system of railroads and communications. Orders here too must stem from administrative direction at a high level.

In a great emergency it is not enough to want to do the right thing and to have good intentions. Plans, foresight, integration and co-ordination, comprehension of the practical, concrete things which can reasonably be accomplished —all these are more valuable than impulsive measures.

If it is necessary, we can plan and prepare for total war under our federal system. The United States has demonstrated great skill in co-operative Federal-state-local programs. The Selective Service System is one such example. The development of state and local civilian defense systems under Federal auspices during World War II is another. It may be possible to prepare for atomic war through the Federal-state-local system. But this is not the good life, and it is not the good society. No one would be so rash as to predict that democracy per se can surely survive the total war of the atomic era.

THE FUTURE

The choice before us is appalling in its consequences. On the one hand, we cannot afford to renounce the atomic bomb until we are assured that international authority is able to inspect and control the exploitation of fissionable materials so as to prevent surprise developments and attacks by any possible aggressor of the future. On the other hand, the longer internationalization is delayed, the greater the prospect of a race of all to be armed for the inconceivable conflict which may erase society and democracy, leaving a disintegrated mass of rural survivors struggling for a barren existence from the soil.

This should be no cause for panic reactions. Fear solves nothing and begets fear. The courageous citizen of democracy must manifest constructive faith that the social will of man can rise to equal heights with his inventive genius; that he can avoid his own destruction. The Republic has endured through many great crises. When faced with the facts, the common man has time and again demonstrated in the United States that he can meet the issues of the day. In 1941, destiny was thrust upon the United States. Then the issue was whether our way of life or dictatorship would rule the earth. It was settled at great cost in blood and treasure.

Realistically we know that the issue of the atomic age is not one which we can solve by our own efforts. Soviet Russia has a system of government which is foreign to us. Yet the U.S.S.R. is a great power and a great enigma. It is hard to believe that the common man in the U.S.S.R. wants atomic warfare any more than the common man in the United States. The great mass of the people rarely seek war except as they are deluded by their leaders. Unfortunately, in recent history, each generation has had to learn the tragedy of war in its own time. Where there is enlightened democracy, the urge to war is remote. Surely we may offer in evidence the fact that the democracies of the United States, the United Kingdom, and France did all in their power to avoid and evade World War II until no choice was left to us by the aggressor nations—Italy, Germany, and Japan.

Now we are in a new era—the atomic age. If power blocs such as the Anglo-American on the one side and the U.S.S.R. on the other solidify, this may well lead us to the suicidal race of total destruction. We alone cannot establish a new international order capable of controlling atomic energy. The U.S.S.R. must meet us part way. It is only in the fostering of a new phase of world internationalism that I see any real chance for the preservation of democracy which has as its foundation stone —local self-government.

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Psychology of Social Change

By DONALD G. MARQUIS

A GREAT deal of thoughtful, careful effort is now being directed toward the planning of an international organization on which we pin our hopes of averting another war. There seems to be an implicit assumption in much of the planning that if the organization is sufficiently good, it will function with the support of its member nations. This assumption is not justified. Only if the people of a country support and demand international government will the representatives of that country be able to create and maintain the international organization.

This point does not need extensive documentation. There are several examples already in which the status of public opinion has put brakes on our international co-operation. We cannot forget what the Senate and the American people did to the League of Nations in 1919 and to the World Court in 1935. Since then, no President has dared to submit any treaty of importance to the Senate until the Charter of the United Nations was formulated. It is no wonder that in drafting the Charter the administration was careful to tone it down so that it would not be rejected as the other agreements had been. The international police force for which the Russians had asked at Dumbarton Oaks was omitted. The compulsory jurisdiction of the International Court of Justice was rejected. The veto of the great powers in the Security Council was upheld. This was not done to appease Russia, though doubtless she wants the veto as much as anyone does; it was done to appease the American Senate and the American people.

The attitudes of the American people will have to undergo a fundamental change from nationalism to internationalism before our representatives will be able to give the United Nations the strength and stability that it requires. It is true that an overwhelming majority of the people now state that they favor some form of international organization. They also say they are opposed to war. On a specific issue, however, their actions belie their words: they do not favor a loan to Russia; they feel that the Pacific islands should be kept under American sovereignty; they would oppose internationalization of the Panama Canal. Perhaps this is to be expected, for we have been brought up for generations in an atmosphere of national pride and patriotism.

THE LAG OF SOCIAL CHANGE

Social change is always a slow and gradual process. It is usually initiated by some new discovery, invention, or technical development. When a new element, like the automobile, becomes an integral part of our daily activities, certain social adaptations, such as building highways and service stations, are made within a decade. Other changes, such as the decentralization of cities or the consolidation of rural schools, are made much more slowly.

There is no guarantee, as a matter of fact, that the introduction of a new device—no matter how desirable or economical—will produce any change at all. Several new types of calendars with obvious advantages over our present one have been invented, but we have seen no steps taken toward their adoption. A simplified phonetic spelling for our written language is available, and experts estimate that by its use two years could be salvaged from the period of elementary education. Well-financed promotion for its introduction has had little effect, however. The adoption of the metric system of measurements would save tremendous effort and money, but despite its use in most other countries and by scientists in this country, it has not been accepted at all by the general population.

Some twenty years ago a professor at the University of Washington devised a new arrangement of letters for the typewriter keyboard. Instead of the usual Q W E R T Y U I O P arrangement, he placed the letters so that those most frequently used were struck by the forefingers, and so that the common sequences such as *th* were struck by alternation between the fingers of the two hands. With the rearranged keyboard, the normal typing speed has been doubled, and the inventor's students have won every speed competition that has permitted the new keyboard. Many people have heard of this typewriter, but I doubt if any of my readers has ever seen one. Although it costs no more to manufacture, is considered less fatiguing by all typists who have learned to use it, and reduces typing costs to half, it has never been manufactured for commercial sale. Indeed, I know of only one office in which it is being used.

CULTURE TRANSMITTED

It seems that society conspires to prevent and retard social change, especially in the realm of attitudes and ideas. This conspiracy is the natural result of our socialized form of living. Parents teach their children, by example as well as by instruction, the customs, habits, and attitudes which they themselves possess. As the child progresses in school, he learns the morals, the skills, and the folkways of his society from teachers who likewise transmit the common or typical norm of behavior. As an adult he may be freed from the restrictions of formal instruction only to find himself the victim of strong motivation to conform to the behavior of his social colleagues. This is the process of transmission of culture which gives historical unity and stability to our society.

An attitude of nationalism, in one form or another, has been a consistent feature of our cultural heritage for generations. We have learned to be proud of our national achievements, many of them gained at the expense of another country or people. We have been indoctrinated with the superiority of our country in natural resources, production facilities, scenic beauty, and moral character. We have learned to value success in competitive behavior at both the individual and the national level. We have acquired a thrilling reverence for the symbols of our Nation—its flag and its anthem. And we have learned these attitudes not in a disinterested academic way, but in an emotionally ingrained way.

Now we are faced with the necessity of changing from nationalistic to internationalistic values. I hope that the considerations I have reviewed do not lead to pessimism. They should, however, make clear the fact that public support for world organization cannot be taken for granted even if the world organization were perfectly designed and provided advantages to every individual and every nation.

MEASUREMENT OF CHANGE

In looking for the facts and principles of the process of social change, we find that the social sciences provide some useful methods for measuring the progress of the change, some theories which assist in predicting its outcome, and some facts which help isolate the influences which retard or facilitate the change. This information is too sketchy and incomplete, however, to tell us definitely and accurately about a specific situation. Social change is not easy to subject to scientific study. Each example of change occurs only once—it is never possible to secure an exact repetition of the event so that the relevant forces can be varied and their effect examined.

It is also true that psychology and sociology, like other young sciences, have been concerned principally with the static description and measurement of events; their methods and theories are just now becoming adequate to permit the study of the more dynamic problems of man and society, and interest in predicting and controlling change in behavior is rapidly growing.

Social change is necessarily a summation of changes in individuals. It is natural that our study should therefore begin with the examination of the process of modification of individual behavior. It is entirely probable that such study will throw light on the nature of social changes of the sort in which we are interested.

LEARNING BY EXPERIENCE

Psychologists know most about the method of individual modification called learning by experience. The consequences of any reaction produce an alteration in the individual such that after many similar experiences a new habit is formed. This process requires repetition of the learning situation, and while it is adequate for the acquisition of language and other social customs, for knowledge, and for vocational skills, it is not suitable when a repetition of the situation would be disastrous, as is the case with war. Moreover, certain types of reactions such as phobias, compulsions, hates, and other so-called abnormal responses are not amenable to modification by ordinary learning methods.

In the sphere of social change, the corresponding method is education. But if education is to have a desired effect, it must be very carefully designed for the specific purpose. Emotional and evaluative attitudes are hard to change once they are established. The acquisition of knowledge about a subject is no guarantee that the attitudes involved will be enlightened and realistic. For example, a study made among a group of college students who had just finished a course on the Negro, found no significant change in their attitude toward Negroes. Samelson has recently reported a nation-wide survey of attitudes toward the Negro in which she compared the responses of persons with a college education, those with a high school education, and those with only an elementary school education. In general, individuals with the most education were clearly better informed on facts concerning race differences and the status and treatment of the Negro. However, the attitudes of the better educated individuals did not differ significantly from the attitudes of the less educated. About the same proportion were unwilling to work on a job with a Negro, would object to having a Negro nurse in a hospital, or would object to eating in a restaurant serving Negroes.[1]

A different technique was used by F. T. Smith with a class of Teachers College students. Instead of merely telling his subjects about Negroes and the reasons for developing a more favorable attitude toward them, he exposed them to two consecutive week-ends in Harlem. With the co-operation of Negro artists, writers, and businessmen, he showed his white subjects the inadequacy of their stereotypes and brought them into contact with Negroes of a kind quite foreign to their previous experience. The change in attitudes resulting from this experience was much more marked than in the other studies.[2]

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[1] B. Samelson, "Does Education Diminish Prejudice?" *Journal of Social Issues,* Vol. 1, 1945, pp. 11–13.

The method of learning or education, while it is fundamental in any long-range program of social change, has definite limitations for critical, rapid changes, especially in respect to those peculiarly recalcitrant reactions of an emotional nature. In individual therapy, it has been necessary to invent and employ other methods.

FRUSTRATION

One of the most widespread mechanisms of changing human behavior involves the threat of punishment, or frustration. The apparent effectiveness of this method and the satisfaction it may provide for the punisher combine to render it a method of frequent choice. Nevertheless, punishment has two very definite limitations, as any observant mother can testify. In the first place, the threat of punishment produces only negative results, not positive. Although it may succeed in preventing a certain undesired bit of behavior, it carries no guarantee of what behavior will occur instead. In the second place, frustration is apt to induce unreasonable emotional behavior. Particularly is this true in problem situations for which there is no ready solution. The emotional reaction may take one of several different forms.

A common reaction to frustration is aggressive behavior and rage. In primitive form this would be a physical attack on the interfering object or person. Social training, however, usually results in the inhibition of overt aggression, and the response appears in a disguised or displaced form. Verbal abuse or gossip may take the place of blows. When aggression against the frustrating agent is prevented, it will be directed at substitute objects, and the "innocent bystander" may suffer.

Other forms of reaction which characteristically occur in severely frustrating situations are regression to more primitive and childlike behavior, fixation of stereotyped, compulsive reactions, and resignation or "giving up." All such behavior is nonadaptive in the sense that it contributes nothing toward the solution of the objective problem of the frustrating situation.

There is a clearly recognizable parallel in social phenomena to the frustration reactions seen in individuals. Frustration on a wide scale may give rise to very active movements toward social change. Indeed, this is the central pattern of any revolution, and the characteristics of frustration behavior are apparent in the social action. A popular revolt is an aggressive movement, destructive in nature, and characterized by stereotyped attitudes. A thwarted, fearful group of people is one ready for emotional expression in one form or another. If a popular leader or demagogue can capture and unite the latent strength of feeling in such a group by proposing aggressive action, he can initiate powerful social change. Examples of different magnitude may be found in the lynching mob, the bonus march on Washington, and the anti-Semitic activities of Nazi Germany. It should be noted that although such social movements can mobilize tremendous force, they do not achieve any constructive social goal; they do not, in fact, even destroy the cause of the frustration.

Is it not possible in some way to capitalize on such social forces for desired objectives? Cannot the shortage of food, the threat of another war, and the awful fear of the atomic bomb be utilized to strengthen an international organization for peace? I am afraid that this is an unrealistic hope. A fearful, thwarted, insecure society is indeed ready to do something; but that something is most likely to be an irrational, emotional action of an aggressive or compulsive or regressive nature. Such a society is more likely to follow a demagogue than a statesman.

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[2] F. T. Smith, "An Experiment in Modifying Attitudes Toward the Negro," Ph D. thesis, Teachers College, Columbia University, 1933.

Suggestions for Social Therapy

Returning now to the individual, we may note that recent psychological study has developed two promising new principles of modification of difficult attitudes. These principles are being found valuable in the therapeutic handling of maladjusted persons and in leading normal persons to greater effectiveness and achievement.

The first principle is that constructive modification occurs more readily when the counselor can establish an atmosphere of acceptance and security rather than an atmosphere of fear or guilt. As developed particularly by Carl Rogers, the procedure differs markedly from the usual interview in which the counselor freely offers correction and advice on the basis of his superior knowledge and understanding of the client's problems. Instead, the individual is encouraged to talk freely about whatever matters most to him, the counselor only reflecting or clarifying the client's attitudes and feelings. In this setting the client is able to gain insight into his problem and work toward a solution of it.[3]

The second principle is that constructive modification may be more rapid and more permanent if the change occurs in a group of individuals as compared with a single individual. Group therapy, in which a number of persons work together under the supervision of a professional leader, has been found to have more advantages than mere economy of trained therapists. Certain kinds of individuals, such as alcoholics and delinquents, who are peculiarly resistant to ordinary individual treatment, show marked improvement in the accepting and supporting atmosphere of group activity. Margaret Mead has found, moreover, that certain food preferences which resisted the usual methods of influence by lecture, argument, and demonstration, could be altered by group discussion leading to a group decision.[4] Bavelas has shown a similar result in an industrial situation. Factory workers who had achieved a stable production rate under piece-rate incentives held a series of group meetings with a psychologist in which they discussed and decided upon a definite production which they could attain in a certain time. Previously, the production rate had been about 60 units per hour; 75 was supposed to be the ceiling. They set a goal of 84 units in their group, and production did not fall below that level during the four months in which records were kept.[5]

What suggestions for social change can be drawn from these illustrations of principles of therapy? Chiefly, that in an atmosphere of security and group identification, people can decide on constructive social goals and proceed effectively to achieve them. Unfortunately such conditions cannot be created by simple legislative action or administrative edict; they are the essence of democracy itself.

Research for International Security

It must be recognized that the various points discussed here have the status of suggestions or tentative ideas. Social scientists do not have at hand accurate answers to the specific practical questions which would have to be asked by anyone interested in the process of changing nationalistic attitudes to internationalistic ones. Social scientists, however, do have the methods by which many of the necessary answers could be obtained. A research program in this field should include three tasks:

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[3] Carl R. Rogers, *Counseling and Psychotherapy* (Boston: Houghton, Mifflin Co., 1942).

[4] Margaret Mead, "The Problem of Changing Food Habits," *National Research Council Bulletin*, No. 108, 1943, pp. 20–29.

[5] Alex Bavelas, cited by N. R. F. Maier, *Psychology in Industry* (Boston: Houghton, Mifflin Co, 1946), p. 264.

1. The accurate measurement at frequent intervals of the status of public attitudes on international questions.

2. The study of the basis of such attitudes by an examination of their relation to the quantity and kind of information held by the individuals, and their relation to other attitudes, convictions, and individual traits of the persons. These data should permit the invention and discovery of new methods of influencing attitudes.

3. The study of the means of reaching and affecting people individually and in groups. Analysis of the content of the media of mass communication—press, radio, movies, and so forth—would provide data on the existing influences. Combined with a correlated checkup of the actual changes in attitudes which result, the data would furnish the information necessary to plan procedure. This type of research procedure is now widely used in planning advertising campaigns where thousands of dollars are at stake, and it has paid off in value to the advertising agencies. Is it unreasonable to expect that a similar procedure would be of value in a problem where so much more is at stake?

A research program of the scope outlined involves a large-scale operation and considerable expense. We might expect the cost to run between one and two million dollars per year. No university or philanthropic foundation is able to finance such a program. It would have to be undertaken by the Government, which now spends a thousand times as much on the maintenance of the armed forces. It is possible that the allocation of $\frac{1}{10}$ of 1 per cent of this amount to social science research might help to make unnecessary most of the military expenditure. There is, of course, no guarantee that the research will produce this result. That is the nature of research, but it is a gamble that must be taken.

A research program of this nature, if it is to be maximally effective in achieving its purpose, should be carried out in all the major nations of the world. In order to assure freedom from national bias, it should be operated under the direction of the United Nations. It is rather exciting to think about the possible results of an impartial objective measurement of public opinion in all countries. There would be adequate advance warning of trouble spots, and there would be a factual foundation for policy decisions.

It may be noted that the United Nations Security Council is now discussing a proposal for the international inspection of the production of fissionable uranium. Since wars are not initiated by atom bombs themselves, but by leaders who believe they have the support of their people, it is not unreasonable to call for an international inspection of public opinion.

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How Technology Changes Society

By William Fielding Ogburn

TECHNOLOGY changes society by changing our environment to which we, in turn, adapt. This change is usually in the material environment, and the adjustment we make to the changes often modifies customs and social institutions. Everywhere there is evidence of the stimulus of war in developing an unprecedented number of inventions which are being added to and changing our material environment. We shall be interested in seeing how these wartime developments in applied science will change society in peacetime.

Inventions influence society today, first by being produced in large quantities in factories and secondly by being used by large numbers of consumers.

Social Effects of Production

The process by which applied science changes our institutions is illustrated by the automobile. This invention led to the development of a great new business, the automobile industry, which has influenced our economic organization by affecting, for instance, integration, competition, and the business cycle. Such a new industry modifies existing industries. For instance, the steel industry is different because of automobiles; so also is the marketing of cotton. This effect is in the creation or great expansion of subsidiary industries. Automobiles virtually created the huge rubber industry. Gasoline production and distribution covered the country largely because of the automotive land vehicles.

The airplane, which came to maturity during World War II, will also create a big industry producing planes. Aviation will, I think, hardly be the basis for as large an industry as the automobile industry. Commercial aviation requires a rather small number of planes—fewer than one thousand can probably handle the passenger business during the first postwar decade. Because of its speed, the airplane is a very efficient instrument in transporting many people in one small vehicle. Also, the amount of air cargo will be reduced because of the high costs, and goods sent by air will be restricted to objects of high value per unit of weight. Hence, not a great many cargo planes will be required unless cargo rates are greatly reduced. Personal aircraft can, however, be the basis of a rather large production, provided a roadable helicopter which is practical and cheap is developed. This, I venture to say, is likely to occur. But even so, the number of helicopter owners is likely to be much smaller than the number of automobile owners.

In addition to the manufacture of aircraft and the transportation by air of passengers and commodities, there will be developed several industries correlated with aviation. These include the manufacture of new synthetic fuels, meteorological equipment, and electronic equipment, and the construction of airports and highways to them.

Inventions not only create and develop industries, but they also destroy them. In early times bronze replaced stone tools, and later iron took the place of bronze. Similarly, the automobile restricted the use of horse and buggies. Such an effect may follow from the invention of recording on a magnetized wire. This invention was used during the war in many ways, but notably by pilots in planes. The pilots, whose hands and eyes were busy, talked into a moving, magnetized wire which recorded what they said or did. Improvements made during the war were such that music can be recorded on these instruments with high fidelity. It is thus quite conceivable that the present method of making phonograph records may be partly abandoned, much as the making of player pianos was restricted by the invention of the phonograph.

SOCIAL EFFECTS OF USE

More changes are directly caused, however, by the users of an invention than by the producers. These changes are the new habits of the users of the invention. For instance, there are several new inventions in the production of books. One is the talking book, in which the book is recorded on a spool of very fine magnetized wire made of strong alloys. Another is the photographing of written pages on microfilm, which is an inch by an inch and a half in size. This film is then projected on a small desk screen two or three feet away. The third new device is the use of type so fine that a book of 350 pages can be placed on one side of one card 3 by 5 inches in size. A magnifier is needed, of course, to read the book. All these inventions, if widely used, will mean changes in reference reading rooms, reading circles, classroom lectures, the handling of rare manuscripts, methods of research, travel of research scholars, and so forth.

Many inventions have not only one use, but many. For instance, there are hundreds of different uses of the photoelectric cell, the so-called electric eye. New uses of this small electronic tube are announced almost every month. Some of its uses are to count those who enter a museum, to determine the winner of a dog race, to measure the amount of smoke that comes from chimneys in a city for the enforcement of smoke ordinances, to turn on automatically the lights at dusk, to pick out the defective tin cans in a series going by on a belt, to sort objects by size, shape, or color, to open for a waitress the door into the dining room, to turn on water, to level an elevator with the floor, to distinguish shades of color too fine for the human eye, and to warn people of the entrance of a burglar. If many new inventions have many different uses and these inventions are widely used, then, of course, there will be many changes in our habits.

In considering these wartime developments, or indeed any new invention, it is not always easy to see in advance what the uses will be. When the X ray was discovered in 1895 by Roentgen, it was not anticipated that this ray would be used as extensively as it was before and during World War II in discovering defects in iron casting, in steel, in rubber, and in many other materials; nor was it known that it could be used to determine whether a painting is a genuine old master or whether it is a fraud.

Indeed, we are not sure that some new inventions will be used at all. If inventions are to be widely used, they should be cheap in price, safe and easy to use, sturdy, readily reparable, and dependable in performance. Furthermore, there must be no suitable substitute with these various properties. An invention which did have a suitable substitute is the autogiro, which performed reasonably well—well enough to fly mail to and from the Philadelphia Post Office roof, even though the landings were sometimes uncertain. But in a relatively short time there appeared a substitute, the helicopter. Now it looks as if the autogiro will not have any further uses. It was difficult to see this, however, before the helicopter, and the helicopter could not well be foretold with certainty.

On the other hand, we can predict with a high degree of probability that the helicopter will have many different uses, particularly because there is no substitute, except the balloon, that can rise and descend vertically from a space no bigger than a tennis court. There is great demand, especially in cities, for an aircraft which has this function. Hence, we decide that the technological difficulties, such as complex controls and vibration, will be overcome. However, other difficulties may arise, or substitutes appear, or we may be overconfident about the demand.

Between the patenting of an invention and its use, the old adage is appropriate: there is many a slip betwixt the cup and the lip. An illustration of this may be the form of facsimile transmission which produces a newspaper by radio in the home or office. We do not know how much use it may have in the production of newspapers. In the first place, there is a low-priced substitute in a newspaper printed at a central printing press and distributed by mail or messenger. The delay in newspaper delivery to farms, however, may mean that farmers will buy this facsimile instrument. On the other hand, only farmers with an electric wire are likely to buy it, or perhaps there are many other inventions which a farmer would rather have than a machine to print his newspaper in the home. And, of course, he can hear the news at less cost from radio commentators.

In the case of the wartime inventions which we are discussing, they have all had some testing in connection with the war. Their success in war does not necessarily mean that they will have peacetime uses, however, since cost was not a factor in wartime. For instance, the rocket is primarily a military weapon, and its peacetime use is not yet seen. There are possibilities, however, that it may be used under certain conditions for transportation of other than explosive, death-dealing materials.

In the case of the turbo-jet engine, the airplane so propelled was especially effective for war purposes because of its great speed, though limited by its shorter range. The jet-driven engine was, like most of the recent war inventions, known before the war. However, it was impractical because alloys had not yet been developed which could withstand the great temperatures of the turbines. But with money and talent directed to this problem during the war, alloys with the necessary heat resistance were discovered in time for effective use before the close of the war.

This achievement would have been difficult to predict before the war, even though the jet engine was known. Thus there may also be some reservations about predicting an extensive use of jet propulsion of airplanes during peacetime because of the great load of fuel required for even a short distance, especially when there is a good substitute in airplanes driven by the reciprocating engine. But, of course, there may be improvements in alloys, in fuels, and in the nature of the jet engine to make it more practical. It is now being combined with engines driving propellers. We can count rather generally on the emergence of a significant invention, though just when a particular stage in its evolution will be reached cannot be foretold with much accuracy.

We see then, from these illustrations, that the early adaptations to new inventions changing our material environment are made by producers and immediate users. This influence is large or small in proportion to the population using and producing the invention. The adaptation is, however, relatively rapid because producers and users change their habits immediately in producing and in using the invention. Of course, it takes a longer time for large numbers of a particular invention to be produced and used than it does for a small number. So these early effects of inventions depend upon their spreading within a population.

DERIVATIVE SOCIAL EFFECTS

When an invention is used by large numbers of individuals, the social effect is often more than merely the arithmetical sum of the individual habit changes. Such is the case when the individuals whose personal habits are changed are organized or when they constitute a social institution. For example, a husband and wife may change their habits somewhat by using the invention of the contraceptive. But a husband and wife constitute a family. Hence, with the use of contraceptives, the institution of the family is changed. The large-family system is replaced by the small-family system—with all its consequent influence on family duties, relations of husbands and wives, time spent away from home, and so on. The changes in traditions and attitudes toward the family as an institution require more time than the changes in the personal habits of a definite though large number of individuals.

There is a lapse of time between the changes in the habits of many individuals when they use new inventions and the changes that occur in the organizations comprised wholly or in part of these individuals. The reason for emphasizing this lapse of time is that it is of considerable social significance. It enables us to see in advance the prospective social changes in our organizations, and to plan and make adjustments accordingly.

Successive influences

The later social effects of an invention are often derived from the more immediate effects, much as the motion of a billiard ball is derived from the motion of the cue ball which strikes it. For instance, family limitation in size frees women from the care of the household with many young children. They have more time to take interest in civic affairs and political activities. Therefore, the interest of women in politics and voting is a derivative effect of the small-family system, which is itself a result of the invention of contraceptives. Again, married women with children seldom work in industry outside the home for pay, but married women without children very often do. Thus, another derivative effect is to introduce into our economic system more women as wage and salary earners. There may be many such primary derivative effects, depending upon the significance of the invention.

There may also be secondary derivative effects, which follow after another lapse of time. For instance, the entry of women into factory work causes the state legislatures to enact protective legislation regarding night work of women, their minimum wages, and the healthfulness of working conditions. So a secondary influence of contraceptives is on the political institutions. There may also be tertiary and other additional derivative influences.

As these derivative influences follow one another, their force becomes less and less until spent. Television will have considerable influence on the family by providing a theater in the home and a schoolroom for the observation and study of current events. Because of this latter effect there will be a derivative influence on schools in their classes in civics, and also an influence on political institutions and parties, especially in selecting candidates for election on the basis of their physical appearance. But this derivative influence on political parties will be slight, much less than the influence on the way the members of the family spend their time. In turn, still further influences will be felt by the tailor, the barber, the dietitian, and the followers of other occupations affecting the appearance of individuals. These influences in turn will be still weaker. As these derivative influences end, the force of the invention becomes negligible.

The fanning-out process

In earlier paragraphs it was stated that often there was not just one use of an invention but many, and that there was often not just one primary derivative influence but several. So there may be many different secondary derivative effects and many different effects of each successive derivative. These influences fan out all along the line with each new derivative influence.

How varied this fanning-out process is may be seen by noting some of the social effects of aircraft. There are so many of these that a systematic, classified account would be too lengthy. Some of them will be listed at random.

The use of aircraft to dust or spray plants with insecticides will have some influence on farm organization. The large farm will have some advantage over the small farm in the use of this new agricultural invention. Also, since pests cannot be fought so well by an individual farmer as by the farmers of a whole region, the Government's leadership may be needed. Indeed, the Government itself may undertake the spraying if co-operation of farmers and private business does not do the job adequately. Here a derivative effect would be a further encroachment on the individualism of the farmer. Similarly, the use of aircraft in dusting forests for destructive pests will have its derivative influences, at least to a minor extent, on the lumber industry and on floods and thus on the economic life of some of the western states of the United States.

In large urban communities, the derivative influences of aircraft fan out to affect the real estate business, the location of industry and residences, city planning, and the business of local transportation agencies.

The airplane, because of its influence on foreign travel with great savings in time, will have derivative influences on investments in other lands, and on the distribution of our publications in foreign countries, which in turn will have some effect on advertising. Probably a wider use of the English language will be a result, since for some years to come the main international airlines will be those of England and the United States, and a very large proportion of the travelers will be English-speaking people.

Recreational travel by air to the Caribbean area from the United States may develop that region as the automobile developed Florida and southern California. Whether the airplane will by-pass the recreational playgrounds in Florida, southern California, and the intervening states is a question. Probably tourism to these states will be stimulated at the same time that the number of visitors to Guatemala, Mexico, Puerto Rico, and Venezuela is being increased.

In international relations a derivative effect of a special form of aircraft, the bomber, has already increased the differential between the small and the big powers and is effecting a realignment of the great powers. The great powers are being reduced from seven to two in number. The small states, because of the airplane, have much less international power significance than they had in 1914, before the First World War and before the airplane had come into use.

These are but a few of the derivative effects of aviation, though they are very important. It seems that the social changes brought about by derivative effects are much greater than those directly attributable to production and to the changes of habits of individual users.

PROCESSES OF INVENTIONAL INFLUENCE

In considering the effect of an invention such as the airplane or television, the general effect that is attributed to such an invention is also due in part to another invention. For example, the development of suburban residences a great distance from a metropolis will not depend wholly upon the helicopter, but also upon the superhighway along which an automobile may travel at great speed without having to stop at a street crossing, since there will be no such crossings. If we were sufficiently interested, it might be possible to allocate the percentage of such suburban development ascribable to the helicopter and the percentage ascribable to the automobile-superhighway combination. Generally it may be said that the helicopter will develop far-outlying suburbs, although such a statement should not be understood to imply that no other invention is involved in the process.

This intermeshing of inventions occurs at all stages of the process of inventional influence: production, use, and derivative social effect. Woman suffrage, for example, has been said to be a derivative social effect of the invention of the tin can; but intermeshed with this influence were the contraceptive, the motion picture, and many other inventions. So, too, in the production stage, the growth of the production of meteorological instruments will not rest on aviation alone but on increasing demands of agricultural production.

A part of this intermeshing of inventional influence may be segregated and labeled the additive process. For instance, the technological unemployment in any one year is the arithmetical sum of instances of technological unemployment caused by the adoption of many inventions during the year and the consequent replacement of individual workers. The small motor, using a fraction of a horsepower, is expected to produce some technological unemployment. This small motor, largely perfected by the Japanese, was used in B-29 bombers to do the work of men, whose numbers they wished to limit. It is a very flexible invention and can be used to do almost any human task not entailing heavy labor. But this small motor will not be the only invention bringing technological unemployment. The mechanical cotton picker, now being introduced on the large farms with flat lands, will throw many hand pickers out of work. So the influences of many inventions may be additive.

In the development of suburban residences and the creation of suburban populations, the influences of the automobile and the electric interurban railway were additive. But this development of the suburbs was also encouraged by the telephone, the motion picture, and the chain store. We do not think of the influence of the telephone, for instance, as being additive in the same way that the influences of the automobile, the helicopter, and the electric railway are additive, for it would be quite difficult to determine what percentage of new suburbanites could be attributed to the use of the automobile and what percentage to the telephone. Rather, these inventions all converge to build up the suburbs. In a similar way, the differential between the great powers and the small nations in the path of war is not wholly the effect of the air bomber. It is also due in part to the tank and other fast devices of mechanized warfare.

PREDICTION OF SOCIAL EFFECTS

The existence of convergence and of the additive process makes the prediction of the social effects of inventions more reliable. We may more reliably forecast the dispersal of urban populations and the decentralization of industry because many different inventions have such effects. First, the threat of bombing to dense aggregations of urban population is expected to have some influence on making those urban communities less dense even during peacetime. Second, the threat of great destruction to our cities in another war may induce factory owners to locate their factories twenty-five or fifty miles away from the big city, since factories are likely to be objects of first attack in air raids. Such factories will take some population with them to their new locations. Similarly, there are likely to be some families with foresight who will prefer to live farther away from a city because of the smaller risk of being bombed. How soon or how great will be such a development cannot be foreseen. If New York, Washington, and Chicago had been frequently bombed in the Second World War, the process would have been accelerated in these postwar or interwar years.

Still, we must hesitate to forecast decentralization, in view of existing inertia and the possibility of avoiding another war. But even so, dispersal will proceed because of the airplane, the helicopter, and the superhighway. Factories with such transportation aids available are likely to move because of cheaper rents, more space, and lower taxes, if a labor supply is available.

The convergence of the influences of many different inventions will also favor the evolution of larger nations and political territorial organizations during the many years ahead. The influence of the air bomber seems to be to integrate the bordering small states with a large central power. These large powers want a zone of security around them. They do not want potential enemies with undue political influence over these small states. Furthermore, they would like to incorporate the military plans of these small surrounding states, including air bases, into their own military defense system. This prospective relationship between the great powers and the neighboring small states is not unlike the relationship in feudal times of the lord on the hill and the small farmers in the neighborhood of his castle.

But it is not the air bomber alone, or the instruments of mechanized warfare alone, that are operating to increase the size of political units. The peacetime influence of many different inventions also promotes the development of larger states, though these forces seem to be rather slow. Thus the nearby states are tied closer together economically, as is the case of Canada and the United States, because of the transportation inventions. Such also is the influence of the radios and the printing presses, which are more likely to flow from the big state to the small one than from the little state to the large one. Motion pictures and schoolrooms in which languages are taught are not without some influence of this nature. Of particular significance is the airplane as used by business men and investors of influence in tying the economic systems of nearby states together. With close economic union, political co-operation becomes more feasible. Therefore, with so much convergence, a prediction of a closer integration by regions has less error.

THE FACTOR OF HUMAN WILL

In these discussions, the influences of invention have perhaps seemed inevitable. But, of course, it is at least theoretically possible that human will power can modify or deny these influences. In any particular instance, the relative influence of fate and freedom is to be figured in terms of probability. In some cases the influence of invention appears to be quite certain. Such was the influence of the automobile in building up the suburbs. In other cases, human will seems more influential. Thus the effect of the air bomber in scattering city populations will be manifest only if there are wars and rumors of wars. We may prohibit all future wars—a matter of human choice and will, it is said—in which case the cities will not need to be dispersed because of fear of bombing. So in this case, human beings can do something practical about preventing an invention from having a particular social effect. The foregoing note merely recognizes the power of human will in social movements. How much this influence is in a particular situation must be determined by special research.

Therefore, in the discussions in the preceding paragraphs about the future effects of the wartime inventions there is a margin of error depending upon the factor of human will. In so far as the discussions have concerned social effects of the past, this factor need not concern us.

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Law and Atomic Energy

By E. Blythe Stason

AMONG its other contributions to society, the legal system furnishes, as well as it may, the necessary rules, principles, and standards to guide and regulate the activities of mankind, to the end that people may live together in relative peace and harmony, and may carry on their everyday activities without unduly impinging on the rights and privileges of others. However, the technological developments of these recent science-dominated years have created severe stresses in the legal system by increasing enormously the interdependence of mankind, thereby requiring infinitely more complicated legal controls to keep in good order the progressively more complex social and economic system. And then by way of climax, the year of our Lord 1945 projected into an already complex society atomic chain fission, and, as time goes on, this, together with the possibilities of the atomic bomb, will further increase the stresses in the legal system. It is not too much to say that no one yet knows whether a democratic legal system can survive these stresses. We earnestly hope it can.

My purpose in this article is to report upon some of the legal implications of modern science, and, since atomic fission not only illustrates the effect of modern science on law as a social institution, but has the further advantage of being dramatic and timely, I shall use its impact on the legal system as the concrete example to buttress my general conclusions.

International and Domestic Aspects

How to wrap the legal system around a technological monster possessing the potentialities of atomic energy, taking account not only of its known values but also of its extravagant possibilities for the future, is an affair of no small dimensions. The problem resolves itself into two phases—one international and the other domestic.

President Truman and Prime Ministers Attlee of England and Mackenzie King of Canada have announced their approval and support of ultimate control of all nonpeaceful aspects of atomic energy by the United Nations. On November 15, 1945, these three representatives of their respective nations met in Washington and issued a Declaration on Atomic Energy, stating at the outset their willingness to proceed with the exchange of fundamental scientific information and the interchange of scientists and scientific literature, all for peaceful ends, with any nation that will fully reciprocate, just as soon as effective and enforceable safeguards against use for destructive purposes can be devised.

The international aspect of the matter is now in the hands of the United Nations. At its London meeting, the United Nations set up a Commission on Atomic Energy. President Truman has named Bernard M. Baruch to be the United States representative on the Commission.

Consideration of the international arrangements is now in progress, although at the present moment there is a substantial dispute between the United States and the Union of Soviet Socialist Republics regarding the character of international safeguards to be adopted. Eventually the international arrangements will become law by being written into a treaty and submitted to Congress for approval.

In the meantime, we must set our domestic household in order. Up to the present time, all of the two billion dollars' worth of wartime development of atomic fission has been conducted by and under the complete control of the War Department, where it was very properly placed in 1942 by the President of the United States, acting under his war powers. Now that the war is at an end, the burden falls on Congress to devise a permanent, peacetime program inducting atomic energy as well as may be into our conventional legal system.

ATOMIC ENERGY ACT

After nearly a year of hearings and study, Congress on July 26 adopted the Atomic Energy Act of 1946, thus writing into law its best judgment concerning proper peacetime controls for the world's most dynamic technological discovery. It is among the most, if not the most, important legislation of our time. In pursuit of some conclusions on the legal implications of modern science, I am going to describe this Atomic Energy Act in some detail, and thereafter I shall lay before you certain generalizations, both concerning the act itself, and also concerning the interrelations of law, administration, and technology.

The act is bulky, consisting of about fifty pages of printed matter. Its objectives are readily understood, but their achievement is exceedingly difficult. The regulatory powers of government in dealing with atomic energy override four separate processes: first, fundamental research in atomic theory; second, mining or acquisition of source materials, that is, the raw elements from which the fissionable material is extracted; third, development of processes and devices by which fissionable material is extracted from source materials; and fourth, utilization of fissionable material in the generation of useful energy.

The law undertakes to control, operate, regulate, or prohibit all of these technological processes as the public interests may require. Thus stated, the legal problem seems simple and not too different, let us say, from the perfectly familiar regulation of the electric power industry, the communication business, or any other public utility. However, because of certain unique potentialities of atomic energy, the simplicity of theory changes into extreme complexity in application.

The act contains 21 Sections. Eleven of them deserve special elaboration.

Declaration of policy

Section 1 states:

> It is hereby declared to be the policy of the people of the United States that subject at all times to the paramount objective of assuring the common defence and security, the development and utilization of atomic energy shall, so far as practicable, be directed toward improving the public welfare, increasing the standard of living, strengthening free competition in private enterprise, and promoting world peace.
>
> It is the purpose of this act to effectuate the policies . . . by providing among others for the following major programs relating to atomic energy.
>
> (1) A program of assisting and fostering private research and development to encourage maximum scientific progress.
>
> (2) A program for the control of scientific and technical information which will permit the dissemination of such information to encourage scientific progress and for the sharing, on a reciprocal basis, of information concerning the practical industrial application of atomic energy as soon as effective and enforceable safeguards against its use for destructive purposes can be devised.
>
> (3) A program of federally conducted research and development to assure the government of adequate scientific and technical accomplishment.
>
> (4) A program for government control of the production, ownership and use of fissionable material to assure the common defence and security, and to insure the broadest possible exploitation of the field.

(5) A program of administration which will be consistent with the foregoing policies and with international arrangements made by the United States, and which will enable the Congress to be currently informed so as to take further legislative action as may hereafter be appropriate.

Organization

Section 2 imposes responsibility for achieving the desired objectives upon an Atomic Energy Commission which is the principal administrative agency created by the act. The Commission is composed of five full-time civilian members, appointed by the President and confirmed by the Senate. Originally the House Military Affairs Committee (Hon. Andrew May of Kentucky, chairman) recommended a commission of nine members and would not have required that they be placed on a full-time basis. In other words, under the original House version the President could have appointed officers in the armed forces of the United States, and thus the door was left open to military domination of the future development of atomic energy. This aroused violent and quite justifiable opposition, and the act as finally adopted, on the insistence of the Senate, and with the support of the President, prescribes a full-time and hence a civilian Commission membership. A salary of $17,500 per annum is prescribed for the Chairman, and $15,000 for the other Commissioners. The Commissioners hold office for terms of five years each.

Within the Commission and subordinate to it, there is a general manager, also appointed by the President with the advice and consent of the Senate, and four division heads appointed by the Commission. The divisions specified are: Division of Research, Division of Production, Division of Engineering, and Division of Military Applications. The head of the last-named division may be a military officer. Then there is a General Advisory Committee, a board of advisers appointed by the President from civilian life. This Advisory Committee is to meet at least four times each calendar year to advise the Commission on scientific and technical matters relating to research and development of atomic energy.

Finally, there is a Military Liaison Committee consisting of representatives of the War and Navy Departments, detailed without additional compensation by the Secretaries of War and Navy. The Atomic Energy Commission is commanded to advise and consult with this Liaison Committee on all matters which the Committee deems to relate to military applications of atomic energy.

Research

Congress has recognized that only by continued progress in science can the high purposes of the act be achieved. In Section 3 the Commission is authorized both to conduct its own research programs and to assist research in private and public institutions by making supporting arrangements through contracts, agreements, and loans in aid of research activities.

Especial care has been taken in various parts of the act to avoid imposing restrictions on private research. Indeed, the power of the Commission over such research is confined to the bare minimum necessary to protect national security and to prevent hazards to the public safety and health.

Production of fissionable material

Congress early became convinced that an absolute government monopoly of the function of producing fissionable materials is indispensable to effective protection of the public interests in atomic energy. A number of reasons point unmistakably to this conclusion, even though it may seem superficially inconsistent with our general reluctance to authorize government to embark upon business enterprises. Most important of all the reasons is the fact that fissionable material is the principal ingredient of atomic bombs, and to permit private manufacture of such weapons would be to turn loose in the world enormous destructive potentialities. Accordingly, Section 4 of the act provides that the Commission shall be the exclusive owner of all facilities for the production of fissionable material. An exception is made of research facilities, and facilities having a potential production rate inadequate to enable the operator to produce atomic weapons. Conversely, it is made unlawful for any private person to own such facilities.

If it so desires, the Commission may itself operate its facilities for the production of fissionable materials. However, the act has endeavored to some extent to reconcile government monopoly with our traditional free enterprise system, and accordingly the Commission is authorized to enter into management contracts with private persons or corporations for the operation of government-owned plants, thus seeking to gain the full advantage of the skill and experience of American industry and measurably to preserve private enterprise in the production of fissionable materials.

Control of materials

The act identifies and defines two kinds of materials, fissionable materials and source materials. The term "fissionable materials" means all those materials capable of releasing substantial quantities of energy through nuclear chain reaction. Specifically mentioned are uranium enriched in the isotope 235, and plutonium (seemingly the only materials now deemed effective), but the Commission may, by regulation, add any other materials which it determines from time to time to be capable of releasing substantial quantities of energy through chain reaction.

Consistently with the purposes underlying the provisions of Section 4, prescribing government ownership of all facilities for the production of fissionable materials, Section 5 declares that the ownership of all the fissionable materials themselves is vested in the Commission, and private ownership thereof is forbidden. The Commission is, nevertheless, authorized to distribute fissionable materials, with or without charge, as an aid to the conduct of research and development activities, for use in medical therapy, or for use in industrial applications, pursuant to licenses hereinafter referred to.

Government ownership of fissionable materials is not, however, extended to what the act calls source materials, that is, to uranium and thorium and ores containing uranium and thorium in useful proportions, but private owners may not transfer or export such source materials without first obtaining from the Commission a license to do so. Although the Commission is not made the owner of all source materials, it is empowered to acquire, in return for just compensation, necessary supplies of source materials wherever found, or interests in real property containing such materials. Source materials on public lands are reserved as property of the Commission.

Military applications of atomic energy

I have now called attention to the fact that the Commission is given absolute ownership and monopoly of the facilities for production of fissionable materials, and absolute ownership of the materials themselves. The Commission is also made a manufacturer of atomic weapons, subject to the control of the President, who must give specific assent to such manufacture. The Senate would have insisted that the Commission be the sole manufacturer of such weapons. The House, however, disagreed, and in the final draft of the act the President is authorized in Section 6 to permit the armed forces also to manufacture such weapons if he deems it desirable for them to do so.

Utilization of atomic energy

One of the vital objectives is, of course, to promote the use of atomic energy in all feasible peacetime activities. Testimony before the committees of Congress has revealed the possibilities of numerous and even startling benefits to mankind in medicine, in public health, and in the production for industry of heat, light, and power. The ultimate utilization of atomic energy promises to bring vast changes in the economic order. At the same time, Congress recognizes that great industrial installations representing nationwide investment and employing many thousands of workers may be rendered obsolete. Congress feels, therefore, that it should retain the opportunity of passing upon and giving the green light to specific atomic energy uses. Section 7 therefore provides:

1. That atomic energy utilization devices (except for research or medical purposes) can neither be manufactured nor used without a license issued by the Commission.
2. That whenever the Commission feels that any nonmilitary use of atomic energy has been sufficiently developed to be of practical value, it shall make a report to Congress stating all the facts with respect to such use, together with its estimate of the social, political, economic, and international effects of such use, and its recommendations with respect thereto, and
3. That no license for manufacture of utilization devices or for use of atomic energy may be issued by the Commission until after this report has been filed with Congress for a period of 90 days during which Congress has been in session (thus affording an opportunity for Congressional veto).
4. That, thereafter, the Commission may in its discretion issue licenses to individuals for the approved industrial purposes. Such licenses are to be "on a non-exclusive basis" and the Commission may "supply to the extent available appropriate quantities of fissionable material to licensees whose proposed activities will serve some useful purpose proportional to the quantity of fissionable material to be consumed," and who comply with certain other conditions. Licenses are to be issued for specified periods of not less than one year each, and they are revocable at any time by the Commission, in accordance with such procedures as the Commission may establish. These provisions grant to the Commission most important authority over future industrial utilization of atomic energy.

International arrangements

Congress recognizes, as does everyone else who thinks seriously on the subject, that the future of civilization is absolutely dependent upon the adoption of effective and enforceable international safeguards against the use of atomic weapons. Binding international treaties are sure to come, and, accordingly, Section 8 of the act provides that the Atomic Energy Act and any action of the Commission thereunder shall be subject to the provisions of any arrangement made for the international regulation of atomic energy. If inspections by international authority or other essential international protective arrangements are agreed upon, they must become the law of the land.

Property of the Commission

Under Section 9, the Commission

takes over all of the resources now owned by the United States devoted to atomic energy development, i.e.: all source materials, all fissionable materials, all atomic weapons, all property of the Manhattan District, and all patents, plants, contracts, and information relating to atomic energy. The Commission thus becomes a very heavy property owner—one of the world's largest.

Control of information

Then follows the all-important provision of Section 10 concerning the control of information relative to atomic energy. The problems here are delicate indeed. Common defense and security of the Nation require the retention of the atomic bomb secret until other nations who might conceivably build such weapons have entered into effective international agreements safeguarding this possibility. At the same time, sufficient freedom of interchange of knowledge must be afforded to permit continued scientific progress. How shall the law draw the line? The act provides that:

1. No so-called restricted data shall be communicated in any manner whatsoever, and restricted data is defined to include all data concerning production and use of fissionable material except that which the Commission finds that it can release without adversely affecting the common defense and security. Severe penalties are attached to the unlawful communication of restricted data.
2. Information with respect to the use of atomic energy for industrial purposes shall not be shared with other nations unless and until Congress declares by joint resolution that effective and enforceable international safeguards against the use of such energy for destructive purposes have been established, and
3. Subject to the foregoing limitations, the dissemination of scientific and technical information relating to atomic energy shall be permitted and encouraged so as to provide the free interchange of ideas and criticisms essential to scientific progress.

This section is going to be exceedingly difficult to administer; the lines between restricted and nonrestricted information will not be easy to draw.

Patents and inventions

Section 11 has been a battleground in all committee hearings. The act prohibits private patents in the area of government monopoly, that is, in connection with the production and ownership of fissionable materials and the manufacture of atomic weapons. Any person who makes an invention or discovery useful for such purposes is required to report the same to the Commission.

On the other hand, patents may be issued in normal course for inventions or discoveries appertaining to nonmilitary utilization of atomic energy. In all such cases, however, the Atomic Energy Commission is given authority to exert a unique control over the patents issued—a control not encountered elsewhere in our legal system. The control is this: The Commission may declare the patents to be "affected with the public interest" if it determines that the free licensing of such inventions is necessary to effectuate the purposes of the Atomic Energy Act. In the event a patent is declared to be affected with the public interest, the Commission is itself authorized to make any desired use of the invention, and any person to whom a license is issued under Section 7 of the act to engage in the utilization of atomic energy may likewise be licensed to use the patented article or process. The owner of the patent, however, is entitled to receive reasonable royalty fees, which may be agreed to between the owner and the licensee, or, in the absence of such agreement, shall be determined by the Atomic Energy Commission.

It is obvious that these provisions

make marked changes in our previous concepts of private patent rights and patent monopolies. Undoubtedly a wise decision was reached when it was concluded that no patents could be tolerated in the area of government monopoly, that is, in the production of fissionable materials and manufacture of atomic weapons. However, the requirement of "compulsory licensing" in connection with devices for the peacetime utilization of fissionable materials presents a more debatable aspect. Whatever objections there may be to patent rights, it is certainly arguable that without such rights so-called "risk capital" will not readily flow into an area of developmental activity, even though royalties as prescribed by Commission action must be paid.

William H. Davis, former chairman of the War Labor Board, and one of the outstanding patent authorities of the country, testified before the Special Committee on Atomic Energy of the United States Senate on this very point, asserting that if the patent rights to utilization devices were subjected to compulsory licensing, it would become necessary eventually for the Government to supply the risk capital, simply because private persons or corporations could not or would not supply it without the expectation of the economic advantage of the patent rights. However, Congress decided to take the chance, and the compulsory licensing feature for utilization of patents was written into the act. This is a distinct innovation in patent law. Only the future can tell whether or not it will tend to slow down the developmental process.

PRINCIPAL JURISTIC FEATURES OF THE ACT

The foregoing are the bare bones of the Atomic Energy Act of 1946. Considering the difficulties inherent in the subject matter, it is a magnificent example of lawmaking and certainly one of vast importance to every man, woman, and child in the country. The President's signature of the bill on August 1 and his appointment of the Commission brought the bare bones to life.

Backing away, for a moment, from the technical details of the legislation just described, what can we say concerning the jurisprudence involved in it? Without seriously straining the imagination, we can draw from it some significant conclusions concerning the impact of atomic fission on our legal system. Let us confine ourselves to two such observations.

Powers delegated to Atomic Commission

We should first notice the broad sweep of discretionary powers given to the Commission—powers to be exercised without effective guiding standards set forth in the law. Although the history of recent years reveals many instances of somewhat similar but less sweeping delegation of discretionary regulatory powers, no other peacetime enactment even approaching in importance the Atomic Energy Act has conferred anything like as much uncanalized power upon an administrative agency—not even the late lamented National Industrial Recovery Act which was felled by the ax of the pre-New Deal Supreme Court. In this regard the Atomic Energy Act occupies a unique place in jurisprudence. It is a juristic innovation rendered necessary by the impact of one phase of modern science on the economic and social order.

Let me illustrate by taking a few examples from the act. The Commission is directed (in Section 3) to aid the research efforts of private or public institutions and in connection therewith "to make arrangements, including contracts, agreements, and loans for the conduct of research." No attempt is made (and perhaps none could be made) to prescribe in the law the standards to be followed by the Commission in aiding research and making the "arrangements" therefor. What institutions shall be helped? How much help shall they receive? What conditions shall be attached to the aid extended? These and other questions must be decided by the Commission without the aid of law and simply in the exercise of its own judgment. In very large measure, the immediate future of research in atomic energy is dependent upon the wisdom of five men acting outside the range of legal rules, principles, or standards.

Again, the Commission (in Section 4) is authorized and directed "to produce or to provide for the production of fissionable materials in its own facilities." The Commission will run a tremendous government business without statutory standards to guide its activities. Or the production of fissionable materials may be achieved by contract with private enterprise obligating the contracting party to produce fissionable material in facilities owned by the Commission, and this may be done under the act without the necessity of resorting to competitive bidding usually required for government contracts. Who gets the contracts? and for how much? and on what conditions? Reliance is placed entirely on the wisdom and judgment of five men acting outside the range of legal rules, principles, or standards.

Again, the Commission (in Section 5) is given authority to distribute fissionable material owned by it, with or without charge, to applicants requesting such material "for the conduct of research, for use in medical therapy, or for use under industrial utilization licenses." With some minor exceptions concerning public health and safety, no standards guide the discretion of the Commission to help determine who will get the materials, and how much, and on what conditions. A great responsibility rests upon five men.

The act provides further (in Section 7) that the Commission may license the "manufacture, production, export or use" of devices for the utilization of fissionable material, "subject to such conditions as the Commission may by regulation establish to effectuate the provisions of this act." The Commission's power to determine conditions is virtually unrestricted.

Thus the act confers on the five members of the Atomic Energy Commission the most sweeping discretionary powers ever conferred on an administrative agency—powers that in very large measure will condition and determine the development and utilization of atomic energy during the generation to come. Wise, competent, and fair administration will be of incalculable value to the country. Maladministration or inefficient administration will be immeasurably devastating.

There is indeed no escape from conferring such powers—from relying largely upon the wisdom of the men who are chosen for these important posts. It is simply not possible, at this stage of the atomic energy game, to write in careful detail the applicable rules of law. Congress therefore has adopted the only alternative and relied upon the judgment of men rather than upon the rule of law. Congress knew what it was doing, but it simply could not do differently.

Secretary of War Patterson, when questioned on the subject by a member of the House Committee on Military Affairs, said: "The hazards in the way of peace alone are so considerable, the dangers from abuse of it are so tremendous, that you have to have strict control by an administrative body."

Government monopoly

As a second major feature of juristic policy in the Atomic Energy Act, we notice the important provisions for government ownership and monopoly and the exclusion of private enterprise from a large segment of atomic affairs. This too has been made necessary by the especially heavy impact of atomic fission on the ordinary affairs of mankind.

As I have hitherto written, the utilization of atomic energy involves four stages: first, fundamental research; second, the production of the raw ores; third, the production of fissionable material and the devices for utilizing it; and fourth, utilization of the fissionable material in war or in peace. Of these four functions, the third is by law made exclusively a government-owned monopoly. The first and second are left to private enterprise, the second, however, being very strictly controlled by licensing procedures. The fourth is, of course, reserved exclusively to government monopoly as far as it relates to military uses, and it is strictly controlled by licensing procedures as far as it relates to peacetime industrial uses. Government-owned monopoly bites deeply into atomic energy—far more deeply than into any other activity of comparable industrial possibilities. Private enterprise, for the present at least, is very largely excluded.

When we consider the possibilities of the future—the development of fissionable materials out of other elements as yet unexplored; the production of atomic energy by the *fusion* as compared with the *fission* of atomic elements; the utilization of atomic energy for the peacetime benefit of mankind; the utilization of by-products such as manufactured radioactive materials—we cannot but be impressed with the extent to which the regulatory features of our legal system concerning atomic energy are likely to affect our civilization. And then, when we reflect that these vast potentialities are of necessity being reserved for government monopoly, or, if left to private enterprise at all, are subject to strict control by an administrative agency acting not in accordance with legal rules but in response to the judgment and discretion of its members, we cannot but be impressed with the thought that so-called free enterprise will not be particularly free in participating in the atomic future, and that the so-called rule of law will be largely replaced over a considerable segment of human activity by control through the judgment of public administrators.

Just to get the problem in proper focus, suppose for a moment that some of our other great natural resources were subjected to like governmental authority; for example, petroleum products or electric power or the manufacture of more conventional varieties of explosives. The Office of Price Administration and the War Labor Board would pale into insignificance. Because of the dangerous potentialities of atomic energy in an unstable international situation, there is absolutely no alternative to the extent of government monopoly and control now written into the law, but we need not be blind to the probable future effect on the economic affairs of the Nation. At the same time, we are entitled to hope that the wisdom of the future will provide for the reduction of government controls by use of discretionary administrative power as the safety of the Nation and the world makes such reduction consistent with the welfare of humanity.

SOCIAL IMPLICATIONS

Since I have dealt largely with the question of atomic energy and the law, I can only briefly touch upon the social (in this case the legal) implications of modern science. Modern science, not only in the development of nuclear physics but generally in its development of manufacturing, communications, transportation, and other branches of industry, has brought a train of economic and social frictions. Modern science brings us airplanes, radio, penicillin, clothing made out of sodium acetate, and now atomic fission. But it also brings us as its indirect contribution large industry with its labor problems, monopoly with financial and business problems, and unemployment with social problems. These things flow more or less directly from modern science as the necessary concomitants of the complex, streamlined, interdependent mankind that has come to depend so heavily on the contributions of modern science.

Now we come to the real point of the paper. Most of the problems that arise as a result of modern scientific and technological development are simply too complex to be solved by writing the rules of the game in precise and definitive form and enforcing them through the judicial system as codes of legal rules and principles. They can seemingly be solved only by increasingly potent and intensive governmental administrative intervention, or, in some instances, even by government ownership; although, except for the Tennessee Valley Authority and now atomic fission, government ownership has not loomed very large in our picture.

These governmental operations necessarily substitute administrative agencies with broad discretionary powers for the conventional processes of the law and the judicial system. They necessarily govern our actions by substituting the judgment and discretion of government officials for the rules, principles, and standards of the legal system. This process of substitution has been growing progressively more pronounced as technology has heaped more and more complex living upon us. The march of time and modern science has carried us away from rule by law and toward rule by public administration.

We have been, are, and wish to remain a democracy. So long as a democratic community can prescribe by law the rules to guide the activities of its people, including its public officials, it can preserve its democratic ideals and methods. However, the experience of history has not yet shown how to preserve democracy when law is completely or even largely replaced by the judgment of administrators, by dictatorial fiat. There have been some tragic recent examples to give us pause, but there must be some way of assuring that administration, even though it is given very great discretionary powers, can be held responsive to popular will. Modern science forces us to find that way. That is the challenge of modern science to the legal system. That is the principal implication of modern science so far as it concerns the system of law under which we live.

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Some Economic Consequences of Science

By Sumner H. Slichter

PHYSICISTS, chemists, engineers, and metallurgists are increasing from ten times to fourteen times as fast as the gainfully employed. Expenditures on industrial research were nine times as large in 1939 as in 1920. This means that a rapidly growing proportion of the population is devoting itself to changing the goods produced by industry, the processes of making them, and the conditions of living. The development of science, of course, must still be regarded as only in its early stages.

Can one safely generalize about the economic effects of the rapid rate of discovery thus far—the effects which have been characteristic of the last century and a half? No two discoveries or inventions need be expected to have the same consequences. One would not expect the discovery (or improvement) of a consumers' good to have the same economic effects as inventions (or improvements) of tools or processes, or as inventions which mainly affect the supply of raw materials. Improvements in transportation as a general rule promote geographical specialization and interdependence, but many discoveries in the fields of chemistry and biology lessen the advantages of geographical specialization. Inventions which increase the supply of goods which are elastic in demand will not have the same effect as inventions which affect the supply of goods which are inelastic in demand. Most inventions of tools or processes are labor saving rather than capital saving—they raise the productivity of capital relative to the productivity of labor. Labor-saving inventions should not be expected to have the same effects as capital-saving inventions. Some discoveries can best be used by large concerns and tend to increase the size of the business unit; others can best be used by small concerns and tend to limit the size of the business unit.

Despite the fact that no two inventions have the same effects and that many inventions tend to offset each other, I propose to generalize about the economic consequences of science during the last century and a half. A few effects, such as increases in productivity or in the variety of products, may be regarded as inevitable results of the increase in knowledge, but most consequences of science depend upon conditions and may change as conditions change. Thus the first effect of science was to raise the rate of population increase; but as science has made possible more economic independence for women and has reduced the birth rate, it has tended to reduce the rate of population growth. The economic consequences of science may be divided into three principal groups: (1) effects upon the physical volume of production and production opportunities; (2) effects upon the structure of the economy and its institutions; (3) effects upon the behavior of the economy.

EFFECTS OF SCIENCE UPON PRODUCTION

Most obvious and best known are the effects of science upon the physical processes of production and the quantity and quality of output. Among these are:

1. An unprecedented increase in output per man-hour going on at an average rate of about 1.7 per cent a year for industry as a whole. This means doubling output per man-hour about every forty years.

2. A rapid improvement in the quality of most goods and an enormous increase in the kinds of products turned out. Never before has the variety of goods

grown as rapidly as during the last century. Not half of the kinds of articles listed in a Sears Roebuck catalogue today were made a hundred years ago.[1]

3. A great increase in the number of occupations. Most of the occupations in existence today were nonexistent a hundred and fifty years ago. Consider the many new occupations connected with railways, electricity, chemistry, automobiles, and aircraft. By constantly creating new trades and professions, science improves the opportunities for men to find occupations which fit their capacities. New occupations have been particularly important in improving the economic position of women. The gain in the productivity of labor engaged in turning out necessities is equivalent to an increase in the number of occupations because it broadens employment options by increasing the proportion of population which can find work on any given terms in making luxuries and semiluxuries.

4. A tremendous increase in capital per worker. Between 1880 and 1940 this increase was about threefold in dollars of constant purchasing power. This is a natural result of the use of power and of the use of more automatic controls. Both more power and more automatic controls enable a worker to manage more equipment. This trend may be expected to continue indefinitely. It means that the great majority of inventions are labor saving rather than capital saving.

EFFECTS UPON THE ECONOMIC STRUCTURE

Science has revolutionized the structure of the economy and has led to the rise of many new economic institutions. Among the principal effects in this group are:

1. A shift from self-employment to working for hire. This is one of the most important consequences of science, because it means that science has created a new type of community. There have been communities in which the vast majority of people were slaves or serfs or self-employed. Until the modern age, however, there were no nations made up predominantly of free employees who worked for wages or salary. A hundred and fifty years ago the number of self-employed outnumbered the employees. Even as late as 1850 the total income of the self-employed was greater than the total income of employees. Today America is a nation of employees, for three out of four gainfully employed work for wages or salaries, and wages and salaries constitute over three-fifths of all income received by individuals.

2. Movement of production from farms and homes into shops and factories, with the result that most output is produced for sale rather than for consumption by the makers. Figures are not available, but one may hazard the rough guess that a hundred and fifty years ago as much as two-thirds of the national output was consumed on the farms which produced it. Today at least nine-tenths of the national output is produced for sale. This fact is one of the principal reasons for the growing interdependence of modern communities.

3. The concentration of certain types of production in the hands of large business concerns employing tens of thousands or hundreds of thousands of persons. It is true that during the last forty years the number of nonagricultural business enterprises has increased as rapidly as the population, and that in 1937 half of the employees in nonagricultural industries worked for enter-

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[1] The great improvements in quality and the rapid increases in the variety of products make it impossible to measure the long-run rise in productivity except by calculating changes in output for short periods on the assumption that quality and variety do not change significantly.

prises having 250 or fewer persons. Nevertheless, 40 per cent of the non-agricultural workers of the country were employed by fewer than 5,000 concerns out of over three million.

4. A shift out of unskilled manual labor into skilled, white collar, and professional jobs. Indeed, so-called common labor is the one category of workers which seems to be decreasing. There were no more common laborers in the country in 1940 than in 1910. Clerical workers, managers, and professional workers have been increasing faster than the average among the gainfully employed. For example, between 1870 and 1940, technical engineers increased over 13 times as fast as the gainfully employed; bookkeepers, cashiers, and accountants, 8 times; artists, sculptors, and art teachers, 5 times; editors and reporters, 3.75 times; architects, 3.4 times; musicians and teachers of music, 3 times; college professors and other teachers, 3 times; dentists, 2.7 times; clergymen and religious, social, and welfare workers, 1.6 times. Between 1910 and 1940 economists and political scientists both increased over 5 times as fast as the gainfully employed, and psychologists nearly 30 times as fast.[2] Although science has been making the country a nation of employees, it has not been building a proletariat. In the industrially backward countries of the Far East and South America, there is little "middle class." Wherever industry based on science develops, a middle class appears and rapidly expands. This does not mean that the community is made more conservative. On the contrary, the middle class is the source of most radical ideas and radical leadership.

5. The rise of new types of organization such as the corporation or the trade union. Both the corporation and the trade union present as many problems for the political scientist as for the economist, because they are new types of government. Among other things, the corporation and the trade union mean that many decisions which might be made by competitive buying and selling in the market are made in other ways —by administrators or representative bodies—and are affected by considerations which do not affect the operation of markets. Administrative considerations, for example, lead corporations to enforce wage scales which differ in important respects from those which would be produced by hiring men at the market prices.

EFFECTS UPON BEHAVIOR OF THE ECONOMY

Most important of all are the effects of science on the behavior of the economy. These effects are virtually innumerable. Among the most noteworthy are:

1. A great increase in the number of materials, processes, or products available to serve any purpose. In the field of textiles, one hundred and fifty years ago wool and linen were the principal textiles. Cotton was expensive. It became cheap. It has been followed by the rayons and nylon and by the development of a variety of papers which compete with cloth at various points. In the field of metals, steel has become cheap and has driven iron out of many uses. More recently aluminum has become a competitor of steel. Plastics and plywood are challenging the metals in many uses. In power production, steam drives out waterpower; the development of electrical equipment gives waterpower a partial comeback; and Diesels become competitors of both steam and waterpower. Atomic power may soon enter the competition. Forging and

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[2] These estimates assume that the change in the number of economists, political scientists, and psychologists is satisfactorily measured by the membership in the professional societies in those fields.

welding become competitors of molding; the telephone and the radio become rivals of the telegraph; the railroads meet increasing competition from automobiles, trucks, busses, and planes. New forms of printing arise to challenge the old letterpress process. The steady increase in alternatives means, of course, that the possibilities of substituting one material or process for another are steadily becoming more numerous and that the economy, to that extent, is becoming more competitive—though business and government arrangements may offset this basic tendency. It means that demand curves for various products have a slow tendency to become more elastic from generation to generation. Or, if one views the matter from the standpoint of the service (not the article) desired, supply curves tend slowly to become more and more elastic.

2. A great increase in the geographical mobility of labor and capital.

3. A more rapid rate of change—more rapid development of new materials, processes, and products. This is a result of the fact that the possibilities of using knowledge grow faster than the stock of knowledge, because each verified proposition has the possibility of being used with every other verified proposition. Never before have large and important new industries grown up in such rapid succession. The last fifty years, for example, have seen the major growth or the entire growth of such important industries as electrical equipment, automobile, electric light and power, chemical, radio, rayon, motion picture, airplane, and air transport. We may be sure that the next fifty years will add many new industries.

4. Increase in the supply of investment opportunities. The supply of investment opportunities is partly the result of the increase in population (and the necessity of new capital formation in order to prevent capital per person from dropping) and partly the result of changes in men's preferences. To a substantial extent, however, it is the result of the development of new materials and new products and of discoveries which increase the amount of capital that can advantageously be managed by each worker.

5. Reduction in the propensity to save. During the early stages of the industrial revolution, the great rise in incomes probably increased the proportion of incomes saved. During the last hundred years, however, this trend seems to have been reversed, partly because employees seem to be less inclined to save than are the self-employed and partly because the large accumulation of capital goods has made less urgent the need for additions to the country's industrial plants and equipment. At any rate, even the rapid rise in real per capita income has not been sufficient to offset entirely the declining propensity to save. As a result, the proportion of the national income saved in 1940 was less than in 1850.

6. Creation of what may be termed an "inflationary economy"—that is, an economy in which the planned savings of individuals and business enterprises fail most of the time to meet the demand for investment-seeking funds. An inflationary economy does not necessarily mean that prices are rising, but it does mean that the price level does not fall as fast as the rise in physical productivity per unit of labor or capital might lead one to expect. The creation of an inflationary economy is assisted by the increase in the monetary base, for which technological progress in mining is largely responsible. One result of the creation of an inflationary economy and of technological progress in mining has been a great rise in liquid assets per capita and also in relation to production.

Between 1840 and 1940, bank deposits and money in circulation per capita increased over thirtyfold—from $17.92 to $598.51. Note that this increase does not include the great rise which occurred during the Second World War. During the period in which liquid assets were growing rapidly the price level showed little change, with the result that the income velocity of money in the hundred years before the Second World War dropped over four-fifths. In 1840 the national income produced in a year was over five times as large as the volume of bank deposits and money in circulation. By 1940 bank deposits and money in circulation were almost equal to the output of the country for a year. This great increase in liquid assets relative to production tends to make the economy susceptible to fluctuations, because it means that small changes in the desire of individuals or business concerns for liquid assets produce large changes in the demand for goods relative to production.

7. Separation of the processes of saving and investment. In the days of owner-operated businesses and almost no capital markets, most saving was done by business owners for the expansion and improvement of their own businesses. It is still true that a large part of saving is done within the business enterprise. Even corporations do what the individual owner-operator has always done, namely, supply themselves with capital out of earnings, though corporations do this to a less extent than do small owner-operated businesses. The rise of a large class of well-paid and steadily employed salaried workers (a new economic class) has caused the development of a substantial flow of savings which are not created in immediate response to investment opportunities. Consequently the flow of savings is not accurately adjusted to the investment needs of industry. Although during periods of expansion investment-seeking funds have been inadequate to meet the needs of industry, and credit has expanded to meet the deficiency, during periods of recession or depression much of the individual saving goes on with little change, producing an excess of investment-seeking funds and aggravating the contraction.

8. An economy geared to expansion and progress. A hundred years ago a larger part of the labor of the community than today seems to have been devoted to adding to the capital of the country. Much of this labor, however, consisted of the services of self-employed farmers and shop owners. Consequently changes in the volume of investment did not have the far-reaching repercussions upon employment and production which they do in the exchange economy of today. Roughly one-tenth of the workers in the present economy make their living by helping to expand the present stock of capital goods—including residences. Another one-tenth make their living by producing replacements for the stock of capital goods as the different items wear out. Any conditions which cause business enterprises to expand less rapidly or to replace existing equipment less rapidly, therefore, throw millions of persons out of work. The economy must keep up the rate of expansion and replacement to which it is geared or suffer depression—unless the drop in the rate of expansion and replacement occurs as a result of decisions to increase purchases of consumer goods.

9. An increase in the inelasticity of the supply of labor and capital after compensation falls below a given critical point. I have already pointed out that the ever growing possibilities for substituting one material or process for another tend to increase the elasticity of supply in terms of functional performance and, under some circumstances, even in terms of specific commodities or services. Nevertheless, as accumula-

tions of property increase and as more incomes rise above the subsistence level, willingness to invest or to work depends more and more upon whether the price offered impresses the sellers as fair. Labor incomes have become high enough, for example, that for a large number of people the question of whether to go to school a year longer, or to enter industry now, or to retire now or a year later becomes a close one, to be governed in large part by wages and conditions of employment. About one out of three families has more than one source of labor income. The larger the margin between incomes and the cost of subsistence, the more "choosy" second income earners can afford to be about the kind of work they do and about whether to work or not.

WHAT SCIENCE HAS NOT DONE

Before undertaking to interpret some of the things which science has done to the economy, let us notice briefly several things which it has *not* done.

1. Science has not brought about a great drop in the price level. This may seem surprising. The index of prices in 1940 stood about 10 per cent higher than in 1840, but the real price level in 1940 was undoubtedly lower than in 1840 because the index has an upward bias. Nevertheless, the drop has been far less than one would expect from the great rise in productivity. The failure of technological progress to produce a drop in the price level is attributable partly to the increase in the supply of money and partly to the strong demand for labor and the rapid rise in money wages. For both of these results, technological progress has been largely responsible.

2. Science has not caused a large amount of technological unemployment, and the problems brought about by the displacement of old products and processes by new have been surprisingly few. A few instances of conspicuous hardship have occurred—the ruin of the indigo planters of the Far East by synthetic indigo, the disastrous effect of the deep mining of sulphur in Louisiana on the sulphur industry of Sicily, and the detrimental effects upon Chile of the fixation of nitrogen. Perhaps the cotton, natural rubber, and silk industries will soon be added to cases of severe maladjustments produced by new competition. One reason why technological unemployment has been small and the economic problems of adjustment to technological change, on the whole, have not been serious is that scientific discoveries have stimulated economic expansion. Another reason is that time is required to perfect new products and processes. The displacement of the old by the new rarely occurs overnight. The automobile, the bus, and the truck took passenger travel from the railroads gradually over a period of fifteen years, during which time roads were improved and cars made speedier, more reliable, and more comfortable. When the Owens automatic machine was introduced into the glass industry, it first made only widemouthed ware. Only gradually was it perfected so that it could be used for milk bottles, beer bottles, and pop bottles. The coal undercutting machine was first used only where conditions were most favorable, but it was gradually improved until it could be used in most mines. Finally, technological unemployment has been kept down and other economic dislocations have been limited by the mobility of labor which technological progress itself has increased. One should note, however, that although the mobility of labor helps to solve economic problems, it often creates problems of social relations.

3. Technological progress has not increased the share of the national income going to property. Throughout most of the period between 1870 and 1940 about

20 per cent of the national income was paid for the services of property; in both 1930 and 1940 the proportion was slightly below 20 per cent. Since the amount of capital per worker trebled during the period, the failure of property to receive an ever growing share may seem surprising. Despite technological change and a preponderance of labor-saving inventions, the rate of return on capital dropped sufficiently to keep the share of property in the national income about constant.

4. Technological progress has not abolished poverty. Some people are unable or unwilling to work. Such people will need relief no matter how high the average income of the community. Many people are not able or willing, regardless of their earnings, to accumulate savings and thus to protect themselves against fluctuations in income. In all income groups there is a high proportion of nonsavers. Hence many people face difficulties as soon as their incomes cease or drop severely. The cases of distress would be more numerous if one out of three families did not have more than one income earner. Finally, poverty is a relative concept. There are many millions of families in the United States with annual incomes of less than $1,000. These families are regarded as living in poverty; but a hundred years ago a family with the purchasing power of a thousand dollars a year at present prices would have been comfortably well to do, and well above the lowest third of income receivers. A hundred years from now, when the average income per family will probably be around $8,000 a year or more, there will still be poverty.

SOCIAL CONSEQUENCES OF ECONOMIC CHANGE

What is the significance of the economic effects of science? What problems do they create? What changes in economic and political institutions do they portend?

Science has created the most dynamic and rapidly expanding economy which the world has ever seen. In fact, as I have pointed out, the economy is geared to a rapid rate of change, and a drop in expansion or replacement means depression. Hence, while the economy is dynamic, it is unstable. Most people regard this instability as the Number One economic problem of the day. Change and expansion mean opportunity, but they also mean insecurity. Hence the very success of science in producing change and expansion has produced a great demand for security. One has to go back to the origins of the feudal system to find security so universally, insistently, and even blindly demanded. The demand for security is accentuated also by the fact that most people are employees and are dependent for their income upon holding certain jobs. The community is now engaged in developing policies intended to limit the fluctuations of employment, and also in instituting arrangements—such as seniority rules, guaranteed employment plans, unemployment compensation, pensions, sick benefit plans—which purport to give security to individual workmen.

The rapid growth of large business concerns, for which science is responsible, has introduced a gulf between industry and the community. Most large enterprises are owned in small lots by thousands of persons and are managed by professional administrators. These enterprises are owned by so many people that they do not seem to be owned by anyone and do not seem to represent the savings of ordinary people. The administrators who run them are often technical experts who have a high proficiency within a limited field, but who may not understand the community and may lack familiarity with the problems of the man in the street and insight into his point of view. Frequently these expert administrators are also out of touch with their own employees. The rapid rise of new types of business organizations made possible by science creates, on the one hand, the need of developing understanding of industry by the community and by the employees of these large enterprises, and, on the other hand, the need of developing understanding of the community and of the problems and aspirations of employees by the administrators of large concerns. Establishment of better contact between industry and the community is likely to require changes in the internal structure of business concerns, changes in policies, and, in many instances, changes in the type of men selected for the top positions.

The transformation of the United States from a nation composed preponderantly of self-employed farmers and artisans to a nation of employees working for salaries and wages raises the basic question of whether communities made up chiefly of employees will be willing to make business ownership sufficiently attractive to permit a high level of employment. The number of jobs depends upon the amount of enterprise in the community—upon the number of men who attempt to derive at least part of their incomes from business ownership and upon the willingness of managements to be venturesome in adding new products, improving old ones, and, in general, in seeking to expand. Will a nation of employees be able to gain enough insight into the minds of business owners and professional managers to do a good job of fostering enterprise? Will employees be able to understand the interest which they themselves have in the supply of enterprise and will they be willing to support policies designed to encourage enterprise and thus to increase the demand for labor? Time alone can answer these questions.

The rise of a nation of employees creates another problem (or group of problems) of basic importance; namely, the position of employees in the economy, their rights and duties and the rights and responsibilities of the unions which workers have organized to protect and promote their interests. The unions are among the most powerful organizations which the country has ever seen. Their potentialities for both good and harm are tremendous. Trade unions may be useful instruments of industrial democracy, enabling thousands of workers to participate in considering common problems and in developing policies. Or trade unions may be tightly run oligarchies or dictatorships largely serving the ambitions of power-loving leaders. Trade unions may be agencies for disseminating broader knowledge and understanding of industrial conditions and problems and for creating more effective co-operation between workers and management, or they may be obstructionist, narrow, and shortsighted, limiting output, compelling wasteful use of labor, enforcing wage demands which discourage investment and create chronic unemployment, and frequently halting production by large strikes. How to realize the constructive potentialities of trade unions and to prevent such powerful organizations from developing serious abuses is one of the pressing problems of the day.

PROBLEMS AND SOLUTIONS

Up to this time I have discussed the economic effects of science without making a distinction of fundamental importance, namely, between the problem-creating effects and the problem-solving effects of knowledge. When knowledge is put to use, it presumably helps to achieve results desirable to someone, to solve some problems. It is also almost certain to create problems. At this point we encounter the most basic of all problems raised by the development of modern science—does science increase the capacity of men to solve problems in the same proportion as it increases their capacity to make changes which create problems?

When A, by putting new knowledge to work, creates a problem for B, B may use science to solve his problem. Hence, the effect of science might appear to be neutral. This is true, however, only as long as action depends on decisions by individuals or small homogeneous groups. When A makes changes which create problems and B seeks to protect himself against these changes, one or both of them may create problems which only the city, the state, or the National Government can handle, or which can be met only by the organization of new groups of people or the adoption of new policies by existing groups. In other words, the faster the rate of change, the heavier the demands on the deliberative and policy-making agencies in the community.

The capacity for action of organizations such as the government, trade unions, trade associations, churches, or large corporations, is limited. Representatives do not like to act until their constituents see the need. The more problems competing for the attention of the public, the harder it is to get a demand for action on any given one. Problems have to become fairly serious before a significant part of a group becomes aware of their existence. Capacity for action often depends upon fairly broad agreements over objectives and policies. The very fact that science has greatly increased the interdependence of individuals and groups increases the number of persons and groups affected by a change and makes it more imperative than ever that solutions be found in terms of broad common interests. Sometimes this is not difficult. The best solution for the inroads of rayon on the cotton industry, for example, is probably the development of insect controls which would help part of the cotton raisers to shift into the expanding dairy industry. However, conflicts of interest within groups or within the community, or simple ignorance of underlying common interests, may make the building up of support for any given line of action a very slow process. Organizations must act through officers who sometimes have interests which demand different action from the interests of the members. For all of these reasons it is true that, given no improvement in the decision-making machinery of government, trade unions, churches, and other organizations in the community, science does increase the number of problems faster than it raises the capacity of the community to deal with them.

Can science increase the capacity of men to manage their affairs? Can it improve the decision-making machinery of the community? I believe that the answer to these questions is Yes. The problems are ones on which political science and sociology should shed much light. One difficulty arises from the fact that current political processes exaggerate the importance of conflicts of interest in the community and minimize the importance of common interests. Hence action is impeded and, when it occurs, is too frequently the result of battles rather than of co-operation. Another difficulty arises from the primitive nature of arrangements for informing the members of the community about their affairs and of maintaining two-way communication between representatives and constituents.

In order to balance the problem-creating and problem-solving effects of science, two areas of knowledge need to be rapidly developed: (1) knowledge of techniques for diminishing the amount of fighting over issues and for increasing the use of co-operative attacks upon problems, and (2) knowledge of the conditions which determine the capacity of individuals to participate intelligently in the affairs of the community and to supervise effectively their representatives who make and execute policies. This second area includes more knowledge of how people can obtain the benefit of the superior information and insight of experts and leaders and still hold the experts and leaders responsible for faithful performance of their duties. Progress of science in these areas would enormously increase the capacity of the community to solve its problems and to adjust itself to changes. It would permit large quantities of knowledge, now unused, to be employed to solve problems. That is why scientific advance in these fields is urgently needed.

PLANNING FOR SCIENCE

This analysis of the needs created by science raises the basic question of whether the growth of knowledge can be planned to meet the requirements of the community, and if so, by whom and how? Many scientists deny that the development of science can be or should be guided by more or less central planning. Some of them emphasize the importance of accident in discovery. Other scientists argue that even if the development of science could be planned, it should not be, partly because the loss in the spontaneity of investigation would diminish the fruitfulness of science, partly because no group of central planners could possibly know the needs of the community well enough to do a good job of planning, and partly because there is not sufficient agreement on needs throughout the community to furnish planners with satisfactory guidance.

All of these difficulties and dangers are real. Even the best of planners will have blind spots, will sometimes be slow to recognize developing needs, and, to some extent, will be affected by the intellectual fads and fashions of the moment. These inevitable limitations of planners and planning may make a case for a multiplicity of planning agencies, but they do not make a case for leaving the development of science to accident. No one who believes that action should be guided by intelligence can quarrel with the proposal that there be agencies to watch the over-all development of science, to study the ever changing needs of the community, and to suggest the directions in which new development seems most to be needed. Planning which would take the form of suggestions, recommendations, and exploratory studies would be informative and stimulating, but not repressive or controlling. It would focus attention on some problems but would not exclude attention to other problems. The most original geniuses would have ideas of their own and would be free to investigate what they wished.

In the field of the social sciences, planning by suggestion and recommendation is done on a limited scale by the Social Science Research Council. Separate and more controversial is the question of how far the centralization of planning should be linked with the centralization of support of research. The Social Science Research Council represents a case, in the main, of the separation of planning and financial support. This compels plans to win financial support by gaining the approval of people whose judgment of their merit is more detached than the judgment of the planners. Many people, however, believe that the development of the social sciences would be accelerated if there were a well-financed central agency, such as the proposed National Science Foundation, which could make comprehensive plans for the development of social sciences and which could also implement its plans with support.

SCIENCE, WISDOM, AND MORALITY

One frequently hears it said that science has increased man's control over matter and over men without raising either his wisdom or his ethical standards. Doubtless man's power over matter and over men has increased too fast for improvements in his wisdom or in his morals. Nevertheless, science has capacity to improve both wisdom and morals.

Wisdom relates not to how much people know but to how they use the knowledge which they possess, how critically they appraise the propositions which are offered as truth, and how carefully they allow for the limitations of their knowledge in making decisions. Men may be wise even though their fund of knowledge is small, provided they are aware of the limitations of their knowledge. The low level of public discussion, particularly political discussion, will cause many people to deny that science has improved the quality of thinking about public policies. Nevertheless, records of discussions of public policies a century or so ago indicate that at least modest progress has been made and that science is largely responsible for it. Better facilities for collecting and transmitting facts have exposed everyone in the community more completely to realities and thus have encouraged men to base decisions to a greater extent upon evidence.

So far, however, only a small beginning has been made, outside of special fields, to use science to improve the quality of decision making—to train individuals to demand evidence, to appraise it skillfully, and to allow for limitations in their knowledge and for unforeseeable developments. There is no reason, however, why virtually all citizens should not be given training in the kind of thinking which must be done in order to reach decisions about policies. The most promising experiments are represented by the case method of instruction in schools of business. Clearly it is within the power of scientists to invent the kind of training in decision making which will revolutionize the quality of thinking and which will make millions of citizens, if not wise, at least far more objective and discriminating than they have ever been.

Science also is capable of making important contributions to the improvement of morals. By improvement in morals I mean a disposition on the part of each individual to put interests which he has in common with large numbers of other individuals in all walks of life higher in his scale of values in relation to interests which are peculiar to him or to small groups of which he is a member. The increase in knowledge must be expected to make men more aware of both special interests and common interests. The effect on scales of value in individual cases is unpredictable. Common interests, as a rule, however, are less obvious and easily seen than special interests. The advance of science, therefore, may be expected to correct the tendency of men to see special interests more plainly than common interests, and to make them more completely aware of their less obvious common interests. To that extent it will tend to raise the importance of common interests in men's scales of values.

The great dread of the world is another war. Can science, by increasing men's awareness of their common interests, help to prevent war? On this question I am not optimistic. Science depends upon communication for its success in helping people to see their common interests and to attach more importance to common interests. The dark shadow which falls across the future and compels us to discount the promise of science to build a friendlier world is the firm determination of the rulers of Russia to permit their people to have no real communication with the rest of the world and to permit no real discussion of public policies and no public or organized criticism of official policies. As long as this condition exists, there can be no prospect that science will help to build friendship and understanding between Russia and the rest of the world. Realization of the full promise of science requires the establishment of normal communication between Russia and the rest of the world and the protection of freedom of discussion within Russia. These are the Number One problems of the world today.

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The Impact of Science on Population Growth

By Warren S. Thompson

MODERN science, in my opinion, has been the chief instrument in effecting the vast growth of the world's population since about 1800—a growth which probably exceeds by 200 or 300 million the growth of population in all the ages prior to that time. Man's reproductive capacity, while small when measured by that of most other living beings, is nevertheless great enough, when it approaches the maximum and when deaths are at a moderate level, to lead to the doubling of his numbers in about twenty-five years, or in each generation.

The chief, if not the only, obstacle to such multiplication has been man's inability to control his death rate. His birth rate has normally been high, although the physiological maximum has probably never been attained because of man's customs and traditions. At death rates of today in the United States and with a birth rate approaching the physiological maximum, the population would double in even less than twenty-five years. But such favorable conditions for population growth have never prevailed for any length of time in a population with a fairly normal age distribution, although they may have existed for several years in a few communities composed largely of men and women from 15 to 30 years of age, e.g., in some frontier communities.

The important demographic facts to remember are that until quite recently man's birth rate has generally been high and his death rate has usually almost equaled if not surpassed it, so that his growth in numbers has generally been slow. His growth has also been very irregular because his death rate has fluctuated widely within relatively short periods. In years of good harvests, or when game was plentiful, or when the run of fish was large, or when disease was mild, the death rate was below the average and population grew rapidly. When the opposite conditions prevailed, the death rate rose and population not only did not grow, but many times declined. Because of these conditions the death rate has until quite recently been the chief determiner of population growth, and even now is so in all but a small part of the world's population.

This being the case, we would naturally look first to the factors enabling us to control the death rate for the primary explanation of the vast population growth in modern times. Since I believe that the development and application of physical and biological science to the control of the death rate will explain the greater part of this growth, let us examine briefly the ways in which this reduction has been accomplished.

Living Standards Improved

The development of physical science has affected the death rate chiefly through technological improvements which have increased man's productive power and have thus enabled him to provide himself with a better living and also with the surplus upon which further scientific progress depended. The development of biological science has not only provided the basis for vast improvements in agriculture, but through the growth of sanitary and medical knowledge has enabled men to reduce the death rate well below what would have been possible by merely raising the level of living. Our modern deliberate control over the death rate really began with the raising of the level of living incidental to increasing productivity by the application of science to industry and agriculture.

Owing to the more dramatic character of the changes in industrial technology which began to attract attention in England about 1750, we often overlook the fact that biological science—animal breeding, selection of seed, improved soil fertility, and many other developments—had already contributed much to the improvement of agriculture, and that the techniques of tillage had also been undergoing significant change as more efficient implements were provided by the new industrial processes.

We are all familiar with the fact that the use of steam increased the productivity of man's labor in the factory and the mine and stimulated his ingenuity to devise better machines to use this new form of power. We also know how it speeded up transportation and cheapened the movement of heavy goods over long distances.

Improvements in agricultural implements enabling man to till larger areas more efficiently and to harvest crops more quickly and with less waste have been almost as important as the utilization of steam in raising his productive capacity and hence his level of living. When the advantages accruing from modern improvements in animal and plant breeding, in pest control, in soil management, are added to these new technical aids to agricultural production, we can readily appreciate the fact that through the application of science, agricultural productivity has continued to mount up to the present moment.

The net effect of these agricultural improvements may be seen in the fact that whereas in 1750 there was probably no country in the world in which agriculture did not require about four-fifths of all workers in order to produce a meager subsistence for all, we have now reduced this necessary agricultural population in such countries as the United States and Australia, where land is relatively abundant, to about one-fifth, and even so, these countries export rather large quantities of agricultural produce. More food and greater comforts have been produced with a decreasing amount of labor. Communities and even nations have become less dependent on local and national agricultural production in those parts of the world where modern transportation has been developed.

There is no reasonable doubt that these technological changes in themselves would have led to a great increase in man's numbers even if there had been no application of science in the fields of sanitation and medicine. Levels of living in a few countries of Europe were affected as early as 1750 by the adoption of scientific methods in agriculture and industry, and by 1800, or a little later, the effects on the death rate were beginning to be felt in much of western Europe, although it was some decades before it was generally realized how it was affecting the level of living, and in turn the size of population.

EFFECT UPON JAPAN AND COLONIAL AREAS

But we need not go back a century or more to study the effects of the application of science to agriculture and industry on population growth. In Japan the yield of the more important staple foods—rice, wheat, barley, and fish—was greatly increased by the improvement of crop varieties, better tillage, the more scientific use of fertilizer, and the extension of irrigation, as well as by improvements in the methods of securing and utilizing fish. The net effect of these changes in food supply was to raise materially the level of living for a rapidly increasing population. Within a few decades the level of living in Japan was raised far above that of her Oriental neighbors, as a result of which her population began to grow quite steadily and rapidly, even prior to any considerable use of modern sanitation and medical science.

In most of southern and eastern Asia the chief aim of the colonial powers from the very beginning was to secure industrial crops and minerals from their subject "backward" peoples; hence, the application of science was at first confined largely to those works best calculated to achieve a profitable economy. It was but natural in these circumstances that the development of ports, roads, railways, and export crops received considerable attention before health work was undertaken. It should also be remembered that as late as the last quarter of the nineteenth century relatively little was known about public health; yet most people in western lands knew of the advantages of the steamboat over the sailing vessel, the railway over the pack-horse, and the steam-driven machine over the treadmill and the hand loom. By this time Europeans had also learned how to build better irrigation works, to grow better crops from selected varieties of seeds, and to transplant crops from one part of the world to another.

But from the standpoint of this article, the most interesting fact is that wherever the application of science was made to the problems of production and health, population responded to the improvements in level of living by a relatively rapid growth in numbers. In Java the population grew from perhaps 4.5 million in 1816 to about 48.0 million in 1940; in India from about 256 million in 1872 to 388 million in 1941; and in the Philippines from 7.6 million in 1903 to 16 million in 1939.

GOVERNMENT A FACTOR

However, the application of science to production, transportation, and health was not the only new factor encouraging population growth in any of these lands. I have mentioned it first only because of its great importance in explaining modern population growth, but it should be noted that science could be put to use only after there was stable and relatively efficient government over rather wide areas. It is significant that technological advance occurred first in those areas of the West where such government prevailed. Good government is such an important factor in this respect that I believe it alone would be likely to result in an increase in population in most lands, even though there were no appreciable scientific advance, especially when it replaced weak and inefficient rule and a multiplicity of constantly quarreling local governments. But I believe it was primarily the improvement in the level of living that brought about the lowering of the death rate some 150 years ago and thus initiated the modern increase in population. It is also the continued advance of science and its application to problems of production and health that have made possible the continuance of population growth in the West up to the present time and that are now beginning to produce the same type of growth in the industrially "backward" areas of the earth.

In the fields of sanitation and medicine, science has also achieved great savings of life. We should not overlook the fact, however, that there could be no effective effort to improve the water supply and the sewage disposal of London until there was a large enough economic surplus to provide labor and materials for these purposes. Equally indispensable were the engineering experience in the building of similar types of works, a knowledge of the advantages of having pure water and of the dangers of poor sewage disposal, and an effective government controlling the area in which these works were to be undertaken. But once a clean water supply was installed and good sewage disposal provided for, the people gained in health and the death rate was further reduced. Thus the development of sanitation, when added to the beneficial effects of a rising level of living, resulted in a more rapid growth of population than the latter alone would have effected. Furthermore, the improvement of medical practice resulting from increasing scientific knowledge lowered the death rate still more and thus improved the health of the people. Incidentally, it is highly probable that the better health thus achieved also substantially increased man's capacity to produce. But the important change brought about was the reduction of the death rate which led to a steady, rapid, and prolonged increase of population.

Let us not forget, however, that progress in medical science, as in all science, is costly and can be achieved rapidly and certainly only where the community can devote much time and money to such work. This is possible only where communities have a relatively large and increasing surplus above the daily needs of the people. Fortunately, however, scientific discoveries and their practical applications, no matter where made originally, can be transferred quickly and economically to all areas where there is a stable and effective government with relatively modest economic means, if there is also a will to do so. This will explain the comparatively rapid progress made in reducing the death rate in such countries as Japan and the Soviet Union and even in less industrialized lands. There was already available a fund of scientific information which had been slowly and laboriously accumulated in the West, as well as the application of this science to the problems of production and health. This made possible the more rapid reduction of death rates in Japan and the Soviet Union than took place in the older industrial countries. However, the levels of living are still very low in the Soviet Union and Japan, and the death rates high according to our present standards. Nevertheless, even their slight improvements in production and health services, coupled with the ability to transport food cheaply, thus averting the worst effects of famine, have reduced their death rates well below those which prevailed in the past and have led to large increases in numbers, a trend likely to continue for some time.

DIMINISHING RETURNS

The effects of the first small "doses" of science on agriculture, on industry, and on health may be likened to the first "doses" of fertilizer on most crops. They produce large proportional returns. As applications become larger, the increase in proportional yield falls off. In the same way, after the death rate has reached a moderately low level, the savings in life for a given expenditure of time and money diminish.

This situation may be illustrated by a comparison of what has happened in the United States and India since about 1900. Without attempting to be too precise, it may be said that the death rate has fallen by about one-third in both countries in the last forty years. In the United States the annual saving of lives has amounted to about six or seven in each thousand of the population, a decline from about 17 per 1,000 to about 11. In India the decline has been approximately 15 per 1,000, from about 45 to perhaps 30. The most favorable thing that can be said of the public health movement in the United States of 1900 is that it was born. We were at that time awakening to the fact that our death rate could be controlled far more effectively than in the past if sufficient time and money were devoted to the task, and since we had a large surplus which we were willing to use thus, the death rate was substantially reduced. But with all our public effort and with the great advances made in surgery and medicine, we have been able to save only 6–7 persons per·1,000, or probably less than half the saving of lives achieved in India, where public health work is as yet far less effective than was ours in 1900.

In the United States the greatest savings in life were made long before 1900, through improvement of economic conditions resulting, in the first place, from an abundance of good land so that hunger never seriously threatened any considerable part of our population; secondly, from the scattering of our population over a vast area, thus rendering great epidemics unlikely; and thirdly, from a generally high level of production which facilitated the support of a large amount of scientific work. Thereby the relatively low death rate of 17–18 per 1,000 was achieved by 1900 despite low expenditures for public health. The reduction in our death rate since 1900 stems more directly from the application of knowledge, medical as well as technical, to the areas of health and industrial and agricultural production.

EFFECT UPON INDIA

In India, where the death rate has probably been between 40 and 50 per 1,000 for innumerable generations, with wide fluctuations from year to year, there was in the past only a slow and irregular increase in population when there was any increase at all. In many years famine and disease must actually have reduced population or wiped out the growth of the preceding years. Between 1872 and 1921 there were only two decades, 1881–91 and 1901–11, in which the death rate was substantially lower than the birth rate and, therefore, in which population grew significantly. With the development of transportation, the extension of irrigation, the improvement of crops, and an extremely modest health service, conditions improved and there was a rapid and presumably fairly steady decline in the death rate in the two decades 1921–41.

This decline can quite reasonably be attributed largely to the application of scientific knowledge to the problems of production and health encouraged by a stable and effective government. I say this because India, unlike the United States, had no large body of new and fertile land on which her people could settle. Her new land was won largely through the irrigation of arid areas, although some was gained by extending transportation into formerly unsafe and inaccessible frontier areas. In spite of these difficulties, the small rise in India's level of living enabled her to reduce her death rate between 1900 and 1940 much faster in absolute amount than was done in the United States. This becomes evident in the fact that between 1921 and 1941 there was an increase of about 83 million in India's population.

It is a serious question, of course, whether India can continue to maintain her 1931–41 death rate of about 30 per 1,000. Her people are still living so near the subsistence level, in spite of the gains made during the last few decades, that famine and disease may at any time again assert their powers of destruction and raise the death rate to the point where there will be little or no increase in numbers. India's control over the death rate attained by the use of science is still extremely precarious.

RELATIVE IMPORTANCE OF FACTORS

Comparison of the decline in death rates in the United States and India since 1900 indicates that although science is probably the most important factor in the reduction of the death rate in modern times, it is not the sole factor, nor is its role the same in all lands. Availability of new and fertile land was probably more important in the growth of population in the United States before 1890 than was the application of science. Moreover, the extension of the agricultural area in America favorably affected the level of living in other areas, notably Europe, during much of the nineteenth century, for not only were the tools of agriculture improved, but food and raw materials could be transported at lower cost.

I would repeat that the impact of science on population growth during the last century and a half has been tremendous; that the development of science has been a chief cause of man's increase in numbers since 1800 and that it will continue to encourage population growth for some time to come among those peoples where the death rate is still the controlling factor. Unhappily, this group still comprises the great majority of the world's population. Among only about one-fourth of the world's population has the death rate been reduced to such a low level that future reductions will have comparatively little effect on population growth. Science has also been responsible in large measure for effecting voluntary birth control in this group. In my judgment, therefore, it is no exaggeration to say that science lies at the basis of modern population growth.

WHAT ARE THE ADVANTAGES?

It is apparent from this brief description of the contribution of science to population growth in modern times that it was in large part "accidental" in the sense that much of this growth was a by-product of the exploitation of science for economic ends. In comparison with the amount of effort expended in trying to utilize science for profit, the effort expended on medical and health work has been almost infinitesimal.

Under these circumstances we would reasonably expect to find that the growth of population was largely ignored, not only by practical men but even by social theorists. Moreover, almost all the notice it received, even when people were aware of what was happening, was commendatory, since we unquestioningly accepted the Biblical injunction to "be fruitful and multiply and replenish the earth." It did not occur to more than a few—and these not the people most actively exploiting science for humanity—that this growth of population might raise problems which would contribute as much to man's difficulties as the high death rate which science was busily reducing.

I regretfully introduce this note of doubt as to the net benefits man may have derived from the reduction of his death rates during the last two centuries. But the facts force us to ask why we should regard it of unquestioned benefit to man to have 400 million Indians in 1945 where there were about 250 million in 1870. We must recognize that but a slight improvement was made in India's level of living, and because of the growth in population resulting therefrom, the people are fast approaching the point where a catastrophe destroying many millions may occur at any time. Then, too, as the Indians increase in numbers and as they learn to manufacture steel and the implements of modern war, will they want more *Lebensraum?* and under the present world organization will they be able to get it without fighting for it?

THE FAILURE OF SCIENCE

Science has shown us how to produce two blades of grass where one grew before, but who will get possession of this extra blade of grass is still determined by force. Science has not shown us how to divide it so that fighting for it will be unnecessary. The growth of population has always, even from primitive times, created problems of *Lebensraum,* and in recent decades the accelerated growth in numbers has made them more urgent and more difficult of solution. Recognizing fully the benefits which the superior techniques of science have conferred upon man, and firmly believing that the present population of the world could be supported at a fairly good level of living if these techniques were employed to the fullest extent, I must yet call attention to the fact that science has not shown us how we can organize to achieve their full use. Furthermore, many of the practitioners of the older and better-established sciences unfortunately refuse to recognize that there can be a science of society whose purpose would be to discover forms of social organization and ways of developing social attitudes which would enable us to use our control of nature's forces for increased human welfare.

Population increase and birth control in western nations during the last century and a half rest largely on the application of science, but through lack of guidance, except by individuals and groups primarily interested in enhancing their own positions, so many new problems have been created that only an incurable optimist can confidently claim that substantial progress has been made in the solution of our population problems. This is not to deny that some hundreds of millions of people live better in normal times, if such there be, than in the past; but if we are to have only increased numbers of people and larger and more destructive wars because of what science has taught us, wherein is the gain?

The reduction of the death rate which we have been accustomed to look upon as an unqualified good is increasing numbers at a rate that is appalling to one who asks how we are to support this increase, to say nothing of the probable future increase, at a decent level of living, assuming that war and its accompanying famine and disease do not destroy a large part of mankind. The development of effective birth control, which might be one of the great milestones on the road to decent living and better human relations, is creating problems of differential growth as between classes, nations, and races which, if left unguided, may cause the human race as much misery as the higher birth rate which it is intended to prevent. In the face of these and a host of other problems which have been created by the application of science to suit the immediate purposes of shortsighted individuals and groups, we must be humble in claiming that the effects of science on population growth have been of large benefit to mankind, and still more humble as we look to a not distant future in which the empty spaces of the earth will be settled and new differentials in population pressure will constantly arise to invite ambitious peoples to enlarge their places in the sun. I believe we can learn to control population growth so as to make it a blessing to all, but I do not believe that it will be a blessing if we do not consciously control and guide it.

NEED FOR SOCIAL CONTROL

I have found in my study of population that the use made of science has had unanticipated and undesired effects on population growth. In many instances it is denied that the changes wrought by the application of science to problems of production and health have had anything to do with the creation of the current problems. The fact is that we are confronted today by new social conditions arising out of the growth of population to which we do not know how to adjust and which our social organization is incapable of employing for the enhancement of human welfare. Under these circumstances it seems to me only common sense to ask how we can expand our scientific knowledge to control the population growth which science in turn has encouraged. This leads me to conclude that we must rapidly increase our knowledge in the field of social control if we would use our abundant physical and biological knowledge for the welfare of mankind rather than for its destruction. Unfortunately, the very possibility of developing a science of social control is denied by many men who are recognized as authorities in the physical and biological sciences, as well as by businessmen, politicians, and the "man in the street." They seem to think that social control is a matter of "hunches" or "natural laws" over which we have no power and that we can profit nothing by study and research into the modes of human conduct. Such an attitude towards the possibility of a science of human control is not particularly surprising in those without scientific training, but it is surprising in those who have been trained to search diligently for facts and to revise constantly their conception of the universe whenever the observed facts demand such revision. In some strange way human conduct is excluded from the category of events which can be explained and controlled if we know enough about the sequence of events and are willing to build social structures adequate for control.

This line of thought would lead us far afield into arguments regarding the "naturalness" of social science as compared with the physical and biological sciences, which is beyond the scope of this article. However, it is my belief that social events are just as "natural" as physical events and that a social science is just as feasible as a physical science. It should not be forgotten that it is only a relatively short time since anyone who believed we could learn about the control of physical events through investigation was regarded as a dangerous and unsound person. If we fail to study intensively how we may establish social control over the power placed in our hands by the physical and biological sciences, we will find, perhaps in the not distant future, that these sciences have become a Frankenstein's monster which will destroy its creators.

I see no reason to doubt that the dangers to human welfare arising from the unguided application of science to problems affecting population growth are as great as those arising in any area where there is absence of direction. Science as such is completely amoral. There is no reason whatever to believe that it will contribute to human welfare except as we develop institutions and other agents of control to use it in ways we decide are *good*. This we can do only if we are willing to study human conduct very intensively and are also willing to use this knowledge to establish organs of control. To do less may very well plunge us back into a "dark age" or even completely destroy the human race.

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Nutrition

By Howard B. Lewis

AMONG the earliest recorded scientific observations of human physiology and nutrition are those of Sanctorius (1561–1636), who published in 1614 in Venice a small book, *De Medicina statica aphorismi* ("Medical Statics"). Each aphorism is a deduction from facts determined by most careful measurements of the weight of his body at different times and of his food and his excretions. He had constructed a chair suspended from a large steelyard, so that he could, using this as a balance, accurately determine his body weight at any time. He was concerned particularly with the "insensible perspiration" of the body, by which was meant the usually invisible exhalations from the body, the gases carbon dioxide and water vapor as we now know them.

Sanctorius stands out as a forerunner in the early years of the seventeenth century of that statical method of physiological inquiry which during the subsequent years was destined to produce such important results.[1]

Lavoisier's Discovery of Organic Oxidation

The modern era of the science of nutrition, however, may be said to have opened with the work of the great French scientist Antoine Laurent Lavoisier (1743–94). He had previously discovered the nature of oxidation, and in 1780, with the mathematician Laplace, published the now celebrated memoir on animal heat. By the use of the thermometer and the balance, he was able to show that the heat of the animal body was derived from oxidations of essentially the same type as other oxidations in the inorganic world.

> Respiration is therefore a combustion, slow it is true, but otherwise perfectly similar to the combustion of charcoal. It takes place in the interior of the lung without giving rise to sensible light because the matter of the fire (the caloric) as soon as it is set free, is forthwith absorbed by the humidity of these organs. The heat developed by this combustion is communicated to the blood, which is traversing the lungs and from the lungs is distributed over the whole animal system.[2]

But the tribunal of the French revolutionists had no need for science or scientists, and on May 8, 1794, there perished under the guillotine this man who was perhaps the most talented of the men of the new republic.[3]

Era of "Scientific Eating"

With the development of chemistry, particularly organic chemistry, under the guidance of the great German chemist Justus von Liebig (1803–73), the new science of nutrition arose.[4] In America, Russell H. Chittenden of Yale and Wilbur O. Atwater of Wesleyan contributed particularly to the development of nutrition, and the era of "scientific eating" was ushered in.[5] By the turn of the century the need for minerals, fats and carbohydrates, and proteins in the diet was clearly understood.

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[1] Michael Foster, *Lectures on the History of Physiology* (Cambridge: University Press, 1901), pp. 145 ff.

[2] Foster, *op. cit*, pp. 244 ff.

[3] Fritz Lieben, *Geschichte der physiologische Chemie* (Leipzig and Vienna: Franz Deuticke, 1935), pp. 37 ff.

[4] Forest R. Moulton (Ed.), *Liebig and After Liebig, A Century of Progress in Agricultural Chemistry* (Washington: American Association for the Advancement of Science, Publication 16, 1942), pp. 19 ff, 40 ff.

[5] Richard O. Cummings, *The American and His Food* (Chicago: University of Chicago Press, 2nd Ed., 1941), pp. 122 ff.

Inorganic salts—minerals (ash)—were needed for development of supporting tissue (bone and teeth) and for other functions; fat and carbohydrate for oxidation to produce the energy, kinetic and thermal, on which the superior position of the vertebrate mammal, man, in the natural world depends; and protein for the building and maintenance of protoplasm. The prime importance of protein had been recognized by the Dutch chemist Mulder (1802–80), who in 1839 suggested the name "protein" (πρωτειὸς, *primarius*) because it "is the origin of so many dissimilar bodies and is itself therefore a primary substance."[6]

It remained for the scientists of the present century to recognize the importance of other and less obvious dietary factors, required in such small amounts by the normal organism that the evaluation of their nutritional role presented new problems of assay, chemical and biological. Mendel of Yale was one of the first to recognize the significance of these developments, and in his Hitchcock lectures at the University of California emphasized the importance of the "little things" in nutrition.[7] Trace elements, vitamins, the balance between nutrients, the contributions of dietary factors to enzymatic and hormonal activity, all characterize these new developments of this period.

FOOD FOR THOUGHT

A few examples will serve to illustrate the changes in point of view occasioned by the discoveries. Many people have held the idea that thought is especially dependent upon phosphorus, particularly since certain compounds containing phosphorus (the phospholipides) are known to be present in the nervous system. The flesh of fish contains considerable amounts of phosphorus (as do many other foods). Hence there arose the belief, perhaps not entirely illogical in those days, that fish was of special value as a brain food. This was advocated by the distinguished scientist Louis Agassiz of Harvard University.[8]

The Federal Office of Experiment Stations (established in 1895) was charged with the determination of the nutritive value of various commodities used for human food. Under the direction of Atwater, extensive studies were carried on. As Cummings has pointed out in discussing these early studies,

> . . . the conclusions reached by the early American workers in the field of nutrition are excellent examples of the fact that a little knowledge may be a dangerous thing. Being ignorant of vitamins and knowing little of minerals, they condemned the use of foods which today are prized. In 1897 it was stated that the amounts of protein and energy supplied by green vegetables such as soup greens and sweet corn were small, and though vegetables were necessary to supply bulk and mineral salts and make the diet palatable, it was probable that a large variety was unnecessary. Canned tomatoes were found to be one of the most costly sources of protein and energy; they served chiefly as an appetizer and when used by poor and undernourished families simply took the place of other materials which though no more expensive were more nutritious and not unpalatable.[9]

Charles Langworthy of the Office of Experiment Stations, writing in 1907, held that although oranges undoubtedly added to the attractiveness of the diet, such foods could well be omitted from the diet without any material alteration of its nutritive value, while the cost of the daily food would thus be considerably lowered.[10] It may be recalled that in this same year the experimental production of scurvy, a deficiency disease, in guinea pigs was first reported and the value of fresh vegetables and fruits, notably cabbage and oranges, as antiscorbutics was pointed out.

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[6] Lafayette B. Mendel, *Nutrition: the Chemistry of Life* (New Haven: Yale University Press, 1923), pp. 14 ff.

[7] Mendel, *op. cit.*, pp. 29–56.

[8] Wilbur O. Atwater, "How Food Nourishes the Body," *Century Magazine*, Vol. 34 (June 1887), p. 249.

[9] Cummings, *op. cit.*, pp. 130 ff.

THE VEGETABLE DISCREDITED

Four years later Langworthy, as a representative of the Department of Agriculture, wrote that the belief in the value of fresh vegetables was handed down from the traditions of the past and that the tonic values of green plants used as spring medicines might be attributed to the fact that "they were a very welcome addition to the winter fare and made the food more appetizing."[11]

In 1913, F. C. Gephart, under the direction of Professor Graham Lusk of Cornell University Medical School, a pioneer in nutrition in the United States, undertook one of the most carefully planned of the earlier studies of the relation between the nutritional value and the cost of foods. The foods as served in the Childs restaurants of New York City, a representative chain of stores serving a great mass of people, were analyzed and an extensive report was prepared. Lusk in the introductory discussion to this work thus comments on the tomato as a dietary adjunct.

> The greatest wonder appears in the cost of the tomato portions. Tomatoes with lettuce and dressing cost over $9.00 for 2,500 calories, nearly as much as cantaloupe at $10.00, while champagne (bought outside the restaurant at $4.00 a quart) costs $14.00 for 2,500 calories.
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> The mystery of tomatoes is baffling. A can of tomatoes is little else than flavored water. The popularity of the tomato probably depends on its flavor and its color. A painter wishing to sell a landscape puts a figure with a red cloak in the center. It is an ancient device. In like manner, a restaurant puts a few lettuce leaves on a plate with a red tomato in the middle, covers it with a little dressing and gets a large price. It is the work of an artist for a connoisseur.[12]

CHANGING THE AMERICAN DIET

Today citrus fruit and tomatoes are recognized as among our valuable sources of a very essential vitamin, Vitamin C or ascorbic acid. An extensive educational campaign has emphasized the value of these foods, earlier considered as unnecessary frills and costly additions to the diet. The success of this campaign may be judged from a recent report of the Bureau of Human Nutrition and Home Economics which concerned the per capita food supply in the United States over the thirty-seven-year period from 1909 to 1945.[13] The average annual consumption of citrus fruit and tomatoes jumped from 44 pounds per person in 1909 to 119 pounds in 1945. Consumption of leafy green and yellow vegetables, important sources of Vitamin A, increased similarly from 77 pounds in 1909 to 134 pounds in 1945. The 1945 consumption of citrus fruit alone represented a 400 per cent increase in thirty-seven years. The increased consumption of citrus and other fruits may be due in considerable part to improvements in marketing and in transportation. Mendel has pointed out in a stimulating discussion of this problem that

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[10] Charles F. Langworthy, "Food and Diet in the United States," *Agriculture Year Book* (Washington: U. S. Department of Agriculture, 1907), p. 376.

[11] Charles F. Langworthy, "Green Vegetables and Their Use in the Diet," *Agriculture Year Book* (Washington: U. S. Department of Agriculture, 1911), p. 449.

[12] F. C. Gephart and Graham Lusk, *Analysis and Cost of Ready-to-Serve Foods: A Study in Food Economics* (Chicago: American Medical Association, 1915), pp. 23 ff.

[13] U. S. Department of Agriculture, Bureau of Human Nutrition and Home Economics, in co-operation with the Bureau of Agricultural Economics, *Nutritive Value of the Per Capita Food Supply, 1909–45*, 55 pp., mimeographed, Washington, June 1946.

> science, the mechanic arts and business organization have combined to revolutionize the distribution and marketing, as one may learn in studying the work of the California Fruit-Grower's Exchange. The once enormous losses from decay have been greatly reduced and the marketed products are of a superior quality.[14]

Another striking example of an improvement in our national dietary is the increased per capita consumption of milk and cheese. In 1909 the figure calculated as fluid milk consumed was 169 quarts; while in 1945 the consumption is estimated to have increased to 257 quarts. This increase in milk consumption is to be attributed in large part to an educational campaign which has stressed the importance of milk as a "protective" food. This has had as a direct consequence the "penny" milk program in our schools, which has made available more ample supplies of milk to a group of people who particularly need it—growing children. Since milk is our chief dietary source of the important mineral, calcium, the greater consumption of milk has increased the available dietary calcium by 40 per cent from 1909 to 1945. Since 1942 the average amount of calcium available per capita has been more than 1.0 gram per day, a figure approximating the "recommended allowance" of the Food and Nutrition Board.

FALLACY OF WELL-FED AMERICANS

In the decade of the twenties, the science of nutrition made rapid progress. New factors, notably the vitamins, were discovered, and in many cases isolated in pure form. Obscure types of malnutrition, the so-called deficiency diseases, were studied and their relation to dietary defects were discovered. We were conscious of the acute deficiency diseases, beriberi, pellagra, and scurvy, but too often thought of them as limited in distribution—limited to regions outside the United States, or, if present in our own country, highly localized in their distribution.

WHITE HOUSE CONFERENCE

The first national recognition of the problem came when, in the face of threatening international complications, President Hoover, in May 1930, called the White House Conference on Child Health and Protection and thus assembled the experts of our country to consider problems of maternal and child health. Foremost among these were the problems of nutrition. It became clear that much of the physical and mental unfitness of a large number of children in the United States could be prevented if the newer findings of nutrition could be properly applied and if the nutrition of women during pregnancy and lactation could be improved. From this beginning, there developed a national consciousness of the nutrition problem. Private and public groups, notably the Health Organization of the League of Nations, were active during the period from 1930 to 1940.

However, there was lacking sufficient knowledge to permit an accurate appraisal of the nutritive adequacy of the diets of this Nation. Such a need was met in part by the studies of the quality of the diets of various population groups made by the Bureau of Home Economics of the United States Department of Agriculture. On the basis of studies made for the year 1936, Stiebeling estimated in 1941 that only one-fourth of the family groups of this country had diets rated as good, more than a third had diets which could be considered fair, and another third had diets which should be classed as poor.[15]

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[14] Lafayette B. Mendel, *Changes in the Food Supply and Their Relation to Nutrition* (New Haven: Yale University Press, 1916), pp. 29-31.

Although the accuracy of these estimates has been questioned, it was generally accepted that the American diet was not of as high quality as was generally believed, and that our national nutrition, while possibly good, was certainly not optimal. Optimal nutrition, not marginal, for all became the goal of workers in the field.

FOOD AND THE WAR

In May 1941, the President of the United States called a National Nutrition Conference for Defense. In an address before this Conference, General Hershey, Director of Selective Service, announced that "the first million physical examinations conducted under Selective Service resulted in approximately 133,000 rejections as unfit for military service *from disabilities directly or indirectly connected with nutrition.*"[16]

To arouse the public, to mobilize the scientific knowledge of nutrition, and to advise the various branches of our Government which were confronted with problems of food became the task of the Food and Nutrition Board of the National Research Council. Human nutrition, both as related to our armed forces and to our civilian population, became, as never before in our national history, the serious concern of many groups, national, state, and local.

It is difficult to appraise the achievements of nutrition in the period of the Second World War. Dr. Frank Boudreau and Dr. Russell Wilder, both actively associated as chairmen with the Food and Nutrition Board, have stated their opinion as follows:

> It is perhaps too early to appraise the contribution of workers in nutrition to the winning of this war, but some credit undoubtedly is due them for the fact that the country has come out of the war with unusually good health reports. Infant mortality has continued its decline despite the war, and in contrast to the usual experience in war. Deaths from tuberculosis have not increased as they always did before in war; indeed a new all-time low record has been obtained. The figures for maternal mortality are better than they were before the war, and the same is true for virtually all death rates which reflect in any way the influence of diet on the public health. We might be less assured of the contribution of nutrition to these better records were it not that in Great Britain the fall in these rates has been even more pronounced, and over there all environmental factors except nutrition were worsened by the war.[17]

The authors comment further on the responsibilities of nutrition workers in the future:

> A concern of those who labored to bring about the recently established United Nations Organization on Food and Agriculture has been to make clear that a primary responsibility of agriculture is the cultivation, not alone of corn or wheat or hogs, but of human health. Sir John Orr has emphasized that satisfaction of the human need for food is the best way, and perhaps the only way, to assure a strong enduring agriculture, and to provide for the welfare of agricultural producers who constitute the majority of the world's workers.
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> This human need for food, however, has a very complex meaning, and those who are informed about this matter because of training in nutrition face the grave responsibility of bringing to our statesmen the information they must have to develop policies which will be based on human need.[18]

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[15] Hazel K. Stiebeling, "Adequacy of American Diets," in *Handbook of Nutrition* (Chicago: American Medical Association, 1943), pp 403–24.

[16] Icie G. Macy and Harold H. Williams, *Hidden Hunger* (Lancaster, Pa.: Jacques Cattell Press, 1945), pp. 34–37.

[17] Frank G. Boudreau and Russell M Wilder, "The Food and Nutrition Board of the National Research Council: A Review of Some of Its Accomplishments and a Forecast of Its Future," *Federation Proceedings,* Vol 5, No. 2 (June 1946), p. 268.

[18] Boudreau and Wilder, *op. cit.,* p. 270.

NEW STANDARDS OF NUTRITION

Some further comments on the work of the Food and Nutrition Board are of interest. It promptly became evident that adequate knowledge of the needs of our population in terms of nutritional essentials was lacking. Proper food planning, conservation, rationing, all would be impossible without proper standards of minimal human requirements. The definition of human dietary allowances thus became one of the early objectives of the Board. Such standards did not exist. The older standards had been based on the old conception of nutrition, and failed to take into account the "newer knowledge of nutrition."

After prolonged study, the Board published a series of "recommended dietary allowances" which were revised in 1945.[19] These allowances listed recommended amounts of those essential nutrients for which it was felt that the available knowledge was adequate to permit such a definition. Jeans, a member of the Board, has stated the significance and the intended use of these standards, as follows:

> The recommended dietary allowances of the Food and Nutrition Board were formulated to be a goal for the nutritional welfare of all normal persons. It is to be emphasized that they do not represent minimum or even average requirements, but rather the amounts of nutritional essentials desirable in the diet. The term average presupposes that some persons require more and some less. The allowances were designed to meet the needs of those normal persons who require somewhat more than the average, those with less efficient usage but still normal. Thus a factor of safety is provided for those who have average or less than average requirements, yet the amounts recommended may permit only maintenance requirements for many normal persons.[20]

"ENRICHED" FOODS

Another activity of the Food and Nutrition Board was its support of the enrichment program.[21] This program had for its goal the restoration to patent white flour and white bread of nutrients (thiamine, riboflavin, niacin, and iron) which had been removed from the wheat grain in the commercial processes of food technology. The nutrients chosen for restoration are those which it is generally believed are most commonly lacking in the American diet and which are supplied in reasonably adequate amounts in whole wheat products.

This plan, which had been actively supported previously by the Council on Foods of the American Medical Association, was endorsed wholeheartedly by the Food and Nutrition Board with the active support of the Federal Food and Drug Administration. By action of the Food Distribution Administration, the requirement that all white bread in commerce shall be enriched to conform to standards set up became effective on January 18, 1943 under War Food Order No. 1. The principle of enrichment of bread and flour has the continued support of most workers in nutrition, although opponents of the program are not lacking.[22] The enrichment of other staple cereals has been promoted to include corn products, corn meal and hominy, and rice, and the enrichment of corn products is required in a number of states.

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[19] Food and Nutrition Board, National Research Council, *Recommended Dietary Allowances*, Revised 1945. Reprint and Circular Series (August 1945), No. 122.

Russell M. Wilder, "Misinterpretation and Misuse of the Recommended Dietary Allowances," *Science*, Vol. 101, No. 2621 (March 23, 1945), pp. 285–88.

[20] Philip C. Jeans, "Human Dietary Allowances," *Federation Proceedings*, Vol. 5, No. 2 (June 1946), p. 279.

[21] Russell M. Wilder and Robert R. Williams, *Enrichment of Flour and Bread*, Washington: National Research Council, Bull. 110, 1944

[22] E. V. McCollum, Russell M. Wilder, Agnes Fay Morgan, and Helen S Mitchell, "To Enrich or Not to Enrich, A Symposium," *Journal of Home Economics*, Vol. 37, No. 7 (Sept. 1945), pp. 397–402.

It must be remembered, however, that the compulsory enrichment program had its origin in a War Food Order and is to be terminated at the conclusion of the "emergency" by Executive order of the President. If the benefits which have generally been believed to result from compulsory enrichment in the last three years are to continue, the proper legislation must be enacted by all of our state governments. Twenty states and two territories now have such legislation. It is perhaps worthy of note that of the Midwest states of the Great Lakes area, one only, Indiana, is now in this group. In many of the others, Michigan included, the opposition of interested groups, notably the dried milk industry, has been such as to kill the bills introduced in the last two years. If we are to continue the benefits which have resulted in the war years, legislation in all states is essential.

One other factor in our national life —food wastage—seriously menaces the gains of the new nutritive programs. We have developed food habits which, judged by the standards of other countries of the world, are wastefully extravagant. It is estimated that "one pound of food in every four that is grown is destined for the garbage dump! . . . Twenty-five acres of every hundred-acre farm are plowed, planted, cultivated and harvested with the produce to be finally discarded as waste."[23]

CO-OPERATION FOR HEALTH

If the goal of our national nutrition is to achieve optimal efficiency and health, co-operation of all interested agencies is essential. Improvements in agricultural practices will ensure not only better yields, but better foods. The possibilities of plant breeding in the production of foods of superior nutritive values are as yet almost unexplored. It may be recalled that from the original sugar beet, a weed of a sugar content of a few per cent only, has come by selection the sugar beet of industry whose pulp today yields more than 15 per cent of sugar. The science of plant breeding should direct its attention to quality as well as yield of staple foods. Food technology, food preservation, will also play an even more important role in the nutrition of the future. The problems of the food supply and of nutrition are highly complex, involving factors and interests in agriculture, commerce, industry, and nutrition.

In closing, the statements of Sir William Osler, the eminent physician, made at a meeting of the New York Academy of Medicine seem appropriate. In a discussion of the problems of education, he is said to have maintained that the essence of success in teaching consisted in "reiteration, reiteration, reiteration."[24] A member of the audience qualified this definition by the addition of the words "without irritation." It is believed that we in the United States have the fundamental basis for a better national nutrition. Our problem is one of education, a continued "reiteration without irritation."

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[23] Robert T. Oliver, "Normal Food Wastage, a Socio-Economic Problem," *American Scientist*, Vol. 32, No. 4 (Oct. 1944), pp. 268–72.

[24] Gephart and Lusk, *op. cit.*, p. 6.

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The Political Impact of Modern Science on Public Health

By Gaylord W. Anderson

INSEPARABLE from the social and political aspects of the modern community is consideration for the health of its people. We who are interested in public health are keenly aware of the truth of the statement so frequently attributed to Benjamin Disraeli that "public health is the foundation upon which rests the happiness of the people and the power of the state. The first duty of the statesman is the care of the public health." No nation can be strong if its people are lacking in physical and mental vigor; the backwardness of disease-ridden people and their inability to break out from the pernicious circle of a low economic status, occasioned by and further causing impaired health, amply demonstrate our national dependence upon the well-being of our people. It is no exaggeration to say that no country has ever been economically, socially, or politically strong that was physically weak.

Disinterest in Public Health

Despite this obvious relationship between health and social, economic, and political stature of the community, the public has shown a singular lack of active interest in its own physical and mental well-being. The average citizen of this country looks upon community health protection as an inalienable right and assumes that it will continue irrespective of his lack of active interest in and support of the program. Public health is rarely an issue of any importance in a political campaign. Few political parties give more than lip service to it in their platforms and only rarely does the candidate for office seek support on the basis of his plans for health improvement. On the contrary, we have, as a people, complacently permitted our elected officials to ignore the public health program and to repay political debts by appointing unqualified personal friends to positions of major responsibility. We have failed to demand that our candidates for public office render us an account of their support of measures designed to improve our physical and mental well-being as well as of their support of sound fiscal and economic policies. It is doubtful if many voters in this country have ever permitted a public health issue to be the deciding factor in determining their support of, or opposition to, a candidate for political office.

The responsibility for this apathy probably rests more with the public health profession than with the people, for as a profession we have been too inclined to ask that we be given the funds with which to work and then be allowed to serve up to the people a program of health protection from which they may profit but in which they need take no active part. We have found it too easy to regulate environmental hazards and to provide essential community or personal services, and as a result have failed to impress upon the residents the importance of the individual or collective responsibility that they must carry.

Even more serious has been our failure to appreciate the public aspect of what we choose to call "public health." We have been preoccupied with the contribution of professional groups that make up the army of health workers, so that the laws prescribing the composition of our boards of health commonly require that the membership of these boards shall include a certain proportion of physicians, a dentist, an engineer, a pharmacist, a lawyer, a farmer, and sometimes even representation from various medical cults. It is inevitable that members chosen on such a basis should too often serve as the protagonists of their respective professions rather than as guardians of the health of the public. In one of our states, for example, the pharmacists recently campaigned for a law to require the appointment of one of their members to the state board of health for the express purpose of preventing that board from providing free distribution of diphtheria antitoxin or other biological products, from the sale of which the druggist might otherwise derive some slight profit.

Public health would do well to emulate the educational system which selects its university regents and its school board members not on the basis of special professional interest in any part of the curriculum, but on the basis of their position as outstanding citizens of the community interested only in the promotion of the welfare of society.

MEANING AND PURPOSE

I have been using the term "public health" on the assumption that there was agreement as to the connotation of the term. Yet it is extremely doubtful if any such agreement actually exists even among those who are most interested in this field of endeavor. Few definitions are more expressive of the scope and probable future development of public health than that of the Massachusetts Legislature of 1869 which, in creating the first permanent state board of health in the United States, gave it a mandate to "take cognizance of the interests of health and life among the citizens of this Commonwealth." This phrase, probably borrowed from English law, has been copied into the statutes of numerous other states so that today it probably expresses the legal concept of public health better than does any more recent definition.

The phrase quoted above merits careful examination if we are to understand the present political trends and future developments of public health. The words "take cognizance of" are possibly somewhat vague but most certainly imply action. They do not suggest that the health department be a mere chronicler of illness and mortality within the community; that it shall placidly observe the physical and mental havoc wrought by physical, social, or economic factors that are subject to control and yet do nothing to safeguard mankind against those deleterious influences. On the contrary, the term "take cognizance of" implies that the health department shall embark on an active program for correction of all of those conditions that may jeopardize the well-being of the citizens. The term does, however, leave broad latitude for judgment as to the means that may be adopted to achieve this end and the extent to which the public health agency shall assume immediate responsibility.

The phrase "the interests of health and life" is likewise one of many implications. It would be difficult to imagine a broader mandate. The attention of health departments was at first directed to prevention of deaths attributable to faulty environment or to spread of infection throughout the community, because they were the most readily preventable with the scientific knowledge then at our command. But the mandate of the people seems clearly to place upon the health department a responsibility for concerning itself with all forces of mortality, whether due to environmental, communicable, nutritional, physiological, or psychological factors. The premature death of a wage earner represents a loss to the community, both in the loss of potential productivity and in the responsibility that society must assume of caring for those who may be left destitute. The community loss and added responsibility are just as great if the death be due to heart disease, cancer, or any other noncommunicable ailment, or to accident, as they are if it be due to typhoid fever or bubonic plague.

BROADENING THE BASE

Nor is the mandate limited to the mere prevention of deaths. The health department must be equally concerned with the elimination of those forces which impair efficient and productive human life. Many of our most serious causes of illness do not kill, but completely destroy the economic self-sufficiency of the individual. For example, chronic rheumatism rarely is fatal, yet is almost unrivaled in its incapacitating effects. Mental disease is a very minor source of death, yet exacts an unmeasured toll of invalidism, impaired efficiency, and loss of productivity. The patients occupying the 657,000 beds for mental diseases in this country are only a fraction of the number of those who, although not in need of hospitalization, have so failed to adjust themselves to the social order that they are incapable of self-support and therefore constitute a temporary or permanent drain on society. It would be shortsighted to suppose that public health service could limit its interest to the comparatively simple task of saving lives and ignore the more important task of maintaining physical and mental efficiency. Nor is there reason to believe that the public has ever desired or expected such a limitation.

OPPOSITION

Unfortunately, there are individuals within certain professional groups that have viewed this broader concept of public health service as an encroachment on their special interests, or who have viewed with dismay the encroachment of government on fields that they considered to be of purely personal interest. So long as government concerned itself with regulation of the physical environment, few could object, except those who were forced to correct conditions existing on their property that might be deleterious to the health of the community. Control of communicable diseases was considered to be within the province of health departments even though spread was not related to an insanitary environment, for in theory, at least, the community had failed to protect its citizens if it permitted a source of infection to circulate freely, thus spreading the disease to his associates.

Yet the proposal to control these diseases, not through exercise of the police power but by increasing human resistance through immunization, was considered by many as an unwarranted governmental undertaking, since publicly supported clinics might serve people who would otherwise seek such protection from private sources. The mere fact that experience showed that in the absence of such clinics protection was not sought, and that any other method of mass protection constituted an unnecessarily expensive charge upon the community, was, and in some places still is, ignored by those who question the right of the people to protect themselves against disease through whatever means they see fit. The government programs for maternal and child health were originally opposed by those who were unwilling to admit to the sphere of governmental concern any activity that so intimately involved the habits and mode of life of the individual.

More recently the same reactionary and shortsighted philosophy has found expression in the opposition to governmental programs for the control of cancer and other degenerative diseases. The first state cancer control program in this country was voted by a legislature in spite of the active opposition of the state health department and medical society, which considered cancer as a personal, not a community, problem, and viewed a program of publicly supported diagnosis and treatment as an encroachment of the state on the practice of medicine. It is futile to attack a program of this character by the supposed witticism that a person has a right to die from whatever disease he may choose, or to object on the grounds of interference with the rights of private medical practice. The individual ought not to be condemned to death from a preventable illness owing to a deliberate withholding of readily procurable facilities to cure the disease, nor does the right that the government grants to the physician to practice medicine imply that the public is renouncing its right to protect itself against disease and death by whatever means it finds suitable and available. To challenge this right would be to attack the essential basis of a democratic government, namely the right of the people to self-determination.

PUBLIC VERSUS PRIVATE AID

It should not be inferred that the forces that have attempted to limit the scope of public health within bounds probably never envisioned by the people are limited to the medical profession. I have selected a few examples from within these aspects of public health merely to illustrate what I believe to be a point of major political importance, namely, the extent to which government may and should take over various activities that were formerly the prerogatives of private enterprise. There is a wealth of court decisions that recognize the right of the people through their government to dictate how and in what manner man may conduct his private affairs lest he jeopardize the well-being of his associates. The police power of government has been very broadly interpreted, even to include the right to compel the individual to submit to such processes as vaccination if these be necessary for the common welfare. We are now faced with the inescapable fact that the maintenance of health is so complicated that unless government participates actively in various fields heretofore left to private initiative, the best interests of the community will not be served. A few examples will suffice to illustrate my meaning.

Within the field of environmental sanitation we are all familiar with the publicly owned and operated water and sewerage systems. There is no denying that the entry of government into these fields has practically eliminated the privately owned companies, yet even the most ardent critic of public ownership of utilities can hardly deny that the community has been well and economically served. The success of governmental participation has naturally raised questions as to comparable activities in other fields that may border on the realm of the utilities. Health departments have already more than toyed with the idea of distribution of so vital a commodity as milk; municipally operated milk stations are far from novel. Governmental production and distribution of certain vitally important biological products such as serums and vaccines not only deprives the drug manufacturer of a potential market, but also deprives the retail druggist of a substantial profit. Yet unless such products are made lavishly and immediately available for those in need of them, and without question as to payment, the public will suffer, for the extent of their use will be governed by the economic wealth of the patient rather than by the medical needs of the case.

Governmental ownership of hospitals has undoubtedly encroached on private initiative, and in some instances has virtually pre-empted what might have been a lucrative field of private endeavor. The number of privately owned mental disease and tuberculosis hospitals is insignificant as compared with those supported by public funds, and is becoming smaller. All but a small proportion of the general hospitals are today supported either by government or by private charity. Similarly, the proprietary medical schools, operated as a money-making scheme for their owners, have disappeared within the field of legitimate medicine except for one or two which are not accredited by most licensing bodies. Thus in the fields of hospitals and medical education, private initiative has lost out in competition with government and philanthropy; yet it would be hard to find those who would advocate a return to the private system or would suggest that the public could have been as adequately served by hospitals and medical schools operated for personal profit.

EQUAL PROTECTON OF HEALTH

The health department laboratory is likewise solidly established as an integral part of the public health structure. Through offering to the physician the benefit of certain bacteriological, serological, and chemical tests, the laboratory enables him to practice a better quality of medicine than would be possible were he forced to rely merely on clinical acumen or to use these tests only when he found the patient to be economically able to afford them. Whenever the decision to utilize such tests is based on the economic status of the patient, the physician is inevitably compelled to practice a poorer quality of medicine than that of which he is capable.

Unfortunately, however, the laboratory service rendered to the public through the medium of the practicing physician is still far too limited. We are faced with the incongruous and somewhat tragic situation that although we are today training our younger physicians to practice scientific medicine which takes full advantage of various tests and laboratory procedures, yet these same physicians, upon the completion of their hospital training, are unable to practice at the highest level of professional competence simply because they can use many of these tests only if the patient is able to pay for them.

If the public is to enjoy the highest level of medical care, it must provide a system whereby the medical need of the patient will be the only factor in determining the use of modern scientific laboratory procedures. There can be no doubt that provision of such aid at public expense through the health department would introduce competition with certain aspects of private practice, but no more than already exists in other fields of related endeavor.

I hope it is apparent from these few examples that the developments of modern science have forced public health service to enter more and more upon functions that are in actual or potential conflict with private enterprise, but that all of these activities serve quite directly to benefit the health of the general public. Some will see in this statement a confession that there is a socialistic trend within public health service. This is correct if we define socialism as a system under which the people undertake and perform those functions and services that they can do more effectively and economically as a governmental activity serving all the people than as a private activity serving only a privileged few. Even if we were so calloused as to deny that the underprivileged are entitled to equal protection of their health and life, we could not escape the cold reality that the public, which will have to support them or their dependents in case of need, has a vital selfish interest in assisting them to maintain their health and, therefore, their self-dependence.

If we can agree from the foregoing that the people have a legitimate interest in the maintenance of their health and have a precedent for active participation in any measure that will tend to safeguard it, we may well ask ourselves what may be the import of this doctrine as to future developments. Scientific developments and their applications have removed many of the environmental health hazards of former years. The principal health problems of the present day are to be found in the fields of adult health and mental hygiene, yet both of these are intimately related to the broader problem of medical care for the entire community.

SOCIALIZED MEDICINE

This is neither the time nor the place to consider the controversial aspects of socialized medicine. Many extreme statements and patent absurdities have been written by both proponents and opponents. The animus of the controversy and the resultant vilification have been a credit to no one. Unfortunately the public fails to realize that such tactics have been resorted to only by a few extremists on either side and not by the mass of persons who recognize the existence of a legitimate problem and are seriously attempting to find the proper solution. I cannot accept the idea that the public considers the medical profession to be so calloused that it welcomes a high sickness rate as a means of personal income, nor can I take seriously the threats of a hotheaded minority of physicians who would organize a medical strike in asking the members of the profession to sign a pledge that they will not participate in the care of patients under a system of compulsory health insurance, if established. Such tactics are not in keeping with the time-honored ideals of medicine, nor are they worthy of any group that prides itself on its professional status.

What seems to me to be of great significance is the fact that when the oratory has been removed from the controversy on socialized medicine, the only point that actually separates the opposing factions is the question of compulsion. Could any of us have envisioned that those who barely fifteen years ago voiced such violent opposition to hospital insurance should now be endorsing all aspects of the various health insurance schemes except that of compulsion? Could we have envisioned the growth of medically organized voluntary health insurance plans? There can be no doubt of the trend toward a radical reorganization of the basis of medical practice and the mode of payment for medical care, nor can there be any doubt that government will assume an increasing interest and participation in such plans. Whether one approves or disapproves of this trend, its existence cannot be denied.

Personally, I should prefer further experimentation with voluntary schemes of health insurance before we resort to compulsion, although I recognize the probability that compulsion may inevitably be necessary. Whatever be the solution, I have no doubt that the health of the public will materially benefit and that government will participate more and more in the problem of medical care.

Such participation is not a radical concept. I have a strong conviction that the health department of the future must concern itself with the problems of better medical care for the general public, and that it is the logical governmental agency to assume this responsibility.

A DIVISION OF FUNCTIONS

The alternative to health department participation is the assignment of this problem to another existing agency or one which may be created for this express purpose. Some would delegate the task to the welfare department on the ground that the problem is intimately related with that segment of the population in need of public assistance. I find this suggestion to be highly illogical, for the trend of so-called socialized medicine is definitely away from the field of relief and toward a program which reaches out to serve all levels of society.

Furthermore, I view with dismay the prospect of further dispersing the public health program among several governmental bureaus. The Federal program has been materially handicapped through the distribution of responsibilities among some twenty different bureaus, some of which may at times be working at cross-purposes. At the state level, public health activities are often scattered among the departments of health, welfare, education, labor, and agriculture, as well as among numerous special commissions. Even the local health program is not unified, as responsibility is often divided among health, welfare, and school departments in addition to boards of water and sewer commissioners. The inefficiency of the average school health program under the board of education, a program from which the community has probably received less return per dollar spent than from any other part of the whole field of public health, and in which we appear to have stagnated at the level of development of a score of years ago, is striking evidence of the disadvantages of divided authority and of assigning an important governmental responsibility to an agency that is not qualified for the task and only superficially interested in the problem.

If we are to achieve increased public health efficiency, we must resist the temptation to separate the program into too many departments, but rather seek to unify those parts that are already too widely scattered. This does not mean a reversion to that plan of former years whereby health and welfare were fused into one large program, a plan that unfortunately still exists in many cities. One of the most extreme forms of such consolidation was found in the old Board of Health, Lunacy and Charity which existed in Massachusetts from 1879 to 1885 and which was popularly said to have little health, much lunacy, and no charity. Few students of public health have found much to justify fusions of this character, as they almost invariably result in a steady deterioration of the health program as a result of sacrifice to the more immediate problems of relief. The depression of the thirties bore striking evidence of this.

It would be unfair to deny that certain students of government have urged a return to the combination of health and welfare largely because of the growing extent to which the health program has embraced more extensive direct service to the individual. In 1930 the state of Maine, at the instigation of a paid bureau of municipal experts, consolidated its programs of health, welfare, mental diseases, and correction—a strange combination at best. The Federal Government accepted a comparable union in the organization of the Federal Security Agency. It would be presumptuous for me to attempt to pass judgment on the total efficiency of such agencies, but I believe it is permissible for me to say that they are not in the interests of the highest possible efficiency or quality of community health protection. I believe it is inevitable and desirable that health departments should broaden the scope of their interest, that they should be the agencies through which government will develop and participate in better medical care of the public, and that they should be made responsible for certain health programs now delegated to other agencies; but I cannot agree with those students of government who would revert to the old and illogical marriage of health and welfare.

EFFECT OF SCIENCE ON HEALTH ADMINISTRATION

One final political trend in public health that is occasioned by modern scientific development is the shift of power from local to state and from state to Federal agencies. The organization of public health on the local level long antedated that on the state level, while an active Federal program is a very recent development. This evolution has been in part the logical expression of our changing concepts of the factors that occasion disease, and in part the attempt to adapt the political structure to a radically altered economic and social order. As long as we envisioned toxic vapors given off by decaying filth as the cause of disease, it was logical that the local community should be entrusted with responsibility for the protection of the health of its citizens. The nature of the apparent problems and the steps that could be taken for their solution were within the scope of even the most primitive form of government.

The developments of science and technology during the latter half of the last century not only altered our concepts of the cause of disease, but also resulted in an economic and social reorganization characterized by greater interdependence of communities. Health problems formerly considered of local concern came to be of concern to neighboring or even distant communities. New problems were recognized, the solution of which required technical procedures beyond the capacity of many local communities. This shift in character of health problems found expression in the creation of state health departments and their assumption of certain responsibilities formerly detailed to local government.

The inevitable consequence of this trend has been the development of a strong Federal program whereby responsibilities that were formerly local, and later state, are now being assumed by the National Government. This is accomplished through the mechanism of subsidies, liberal Supreme Court interpretation of the Constitution, and the development of active programs of public service under the public welfare clause of the Constitution.

TREND TOWARD CENTRALIZATION

This rapid shift in public health responsibility from local to state, and from state to Federal, has been viewed not without some measure of apprehension by those persons who see in it evidence of a loss of local autonomy. It is impossible, however, to view this trend objectively without concluding that it is not only inevitable but also desirable, and that it is merely an expression of a far broader trend that manifests itself in other spheres of government.

Many cities have pooled resources with the contiguous rural areas to organize a city-county health department. Groups of towns or counties have been organized into health districts, either for maintenance of their entire health program or for special functions such as water supplies, sewerage systems, hospitalization, or nursing service. There can be little doubt that health services that are rendered directly to the public should be organized on the basis of the smallest political unit consistent with efficiency and economy, but it is equally apparent that modern scientific developments have rendered most of our local units of public health too small for this purpose. Unless our local governments are ready to effect some form of reorganization, they cannot render modern health services consistent with the needs of the community.

I have purposely avoided discussion of the bearing of specific scientific developments upon the scope of public health. There are obviously many such developments. The research of the war years, when we were forced to find new ways of protecting the health of our troops in all corners of the earth, under conditions that varied from the destructive cold of arctic wastes to the arid heat of the desert or the humid steam of the disease-infested jungle, has opened up many new fields of potential public health development. Ever since the advent of the bacteriologic era precipitated by the discoveries of the latter half of the last century, we have seen an exciting program of scientific development which has broadened the field of public health and enabled us to envision the removal of many hazards which have blocked our achievement of a reasonable span of human life and have grossly impaired human efficiency.

All of these discoveries have had their specific effects on public health. An even broader and more fundamental effect has been produced, however, through the sum total of all scientific discoveries, which have so altered the social and economic structure of society as to necessitate a reappraisal of the scope and structure of the public health program. The scope has been constantly broadened; future years must inevitably witness even greater expansion in which government will of necessity assume responsibility for certain community activities heretofore carried on under private initiative and in which it will either render more service directly to the public or participate with private enterprise in a co-operative program of health service and protection. The future must likewise witness an extension of the transfer of public health responsibility from the smaller to the larger units of government, from local to state, and from state to Federal. Unless we are prepared to accept these trends and take full advantage of the opportunities for better health service that they afford, I can see no likelihood that the community of tomorrow can profit fully from the advances that modern science offers or that it can take full "cognizance of the interests of health and life among the citizens."

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Secondary Education for a New World

By JOHN W. STUDEBAKER

IN THIS postwar period we read and hear much of the "new world" which is to arise out of the ruins of war, but I am not certain just what connotation should be attached to that term "new world." Is it a "new world" in the sense that the applications of science and technology have already resulted in the change of many of our institutions, laws, and customs and challenged not a few of our beliefs? In this sense "new world" is synonymous with "changing world," and especially with the accelerated rate of change brought about by the war. In the words of Carl Becker,

> Making a new and better world is something that is or should be *always* going on. In the present state of the world the task is far more complex, and therefore far more difficult, than it has been for some centuries past; our only advantage is that we have more knowledge and more power for doing what needs to be done. If the war shocks us into taking the task more seriously than we have hitherto done, so much the better. But let no one suppose that the war will have made the task any easier or have revealed to us any magic formula for setting the world straight all at once . . .[1]

Setting the world aright will be an extended task and we must therefore look to the preparation of the young people for the part they will play in this project. A good beginning might be an examination of the educational system of this country in light of this preparation. Since I am limited for space, I can only touch upon one aspect of education—the role of the secondary school. How shall we evaluate the secondary school curriculum and plan the changes needed?

Education in our democracy, like many other aspects of our common life, is something less than perfect. It suffers from many ills, not the least of which are the wide discrepancies between our educational ideals and our educational practices. Americans generally accept the ideal of free and universal schooling—schooling for the children of the rich and the poor—but it is an ideal still largely unattained. Every effort should be made during the postwar years to eliminate existing discrepancies.

SPECIAL PROBLEM OF RURAL HIGH SCHOOLS

The first challenge to postwar effort is to provide education for all American youth. We have come a long way in the last generation toward greater equality of educational opportunity. In 1890 only about one boy or girl in ten attended high school; just before the recent war, seven in ten attended; and in some larger communities, nine out of every ten were in high school. Yet, even now, in many rural areas fewer than half of the farm youth of high school age are in high school.

Special attention in the postwar world must be given to the problems of these rural high schools. The extension of free transportation to rural youth constitutes one of the major developments of recent years. Despite this development and the appearance of an increasing number of consolidated rural high schools, thousands of rural youth must still travel long distances at their own expense to reach a high school, many of them leaving home at daybreak to return at nightfall. Others must board out to be near a school. The expense of high school attendance, both in actual cash outlays and in loss in productive services at home, is an additional deterrent to high school attendance by farm youth.

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[1] Carl L. Becker, *How New Will the Better World Be?* (New York: Alfred A. Knopf, 1944), p. 244.

In the smaller rural high schools, dependent upon staffs of three to five teachers for all teaching, administrative, and extracurricular services, a broad curriculum suited to the various needs of rural youth is a rarity, if not a practical impossibility. These schools quite generally offer only the academic college preparatory staples of English, history, mathematics, science, and a foreign language, plus some physical education. A relatively few larger schools may perhaps also provide a course in home economics for girls and in agriculture for boys.

Curricular diversification, especially of a vocational preparatory character, in most of our states is tied up with problems of school organization and finance. No doubt something more could be done in many small high schools to provide a better-balanced program of subject offerings than is being done. Yet there still remains the obstinate fact that the size of a school puts severe limitations on the number and the variety of specialized subjects it is possible to offer with requisite economy. These limitations can be relieved only as the states find it possible to consolidate more of their smaller rural high schools, and also to provide means by which many more youth are enabled to attend these larger and centrally located high schools.

EDUCATIONAL PLANT FACILITIES

Associated with plans for the curriculum and program of the schools—not just the schools of a single community but of a state as a whole—is the problem of school housing. Locating school buildings of given types as a part of a general program of public works without regard to more than local educational needs may commit not only the community but the state to an expensive and ineffective program for decades to come. It has the possibility of freezing for another century the present wasteful and inefficient organization of a multitude of little school districts, each with insufficient wealth or population to provide a modern program of secondary education. Only by planning on a state-wide basis for the location of new educational structures to house the program of secondary education can we hope to make available the diversified courses needed.

In the planning of new high schools we would do well, moreover, to consider adequate provisions for some of the newer educational aids and devices such as radio, television, and motion pictures. The wide use of such instructional aids in the training programs of the armed forces has resulted in convincing evidence of their important possibilities for postwar education. If these possibilities and others are to be realized, we shall need to build into our modern high schools several large classrooms equipped with these instructional devices, where, under direction, large groups of young people may be assembled for instruction. By breaking away from the stereotyped notion that the high school classroom should accommodate not more than about forty pupils, we can increase materially the efficiency of instruction and pay higher salaries to superior teachers—and do both without any unreasonable increase in per-pupil costs for such instruction.

It has been customary to think that apart from the auditorium, the gymnasium, the lunchroom, and the library, the high school building should be cut up into rooms 22 feet wide and 32 feet long, each to accommodate about 35 pupils and to be served by a regular full-time teacher. There inheres in this custom the notion that practically all subjects should be treated uniformly and that the number of pupils in the various groups should be kept nearly equal. In general, the policies and programs of the schools have emphasized the need for teaching rather than the importance of learning. Schools of the future should reverse the emphasis.

SCHOLARSHIPS AND FELLOWSHIPS

Before leaving this subject of means for making an improved high school program available and effectively free to all youth, let me insert just a brief word about the need for scholarships to enable young people of ability to continue their education in high schools and colleges.

Before World War II almost a third of the graduates of our high schools entered colleges. Both numerically and relatively that was a larger proportion than ever before had entered college in this or any other country. Yet, before the war fully half the youth who should have been in college could not afford to attend. In the school year 1946–47, with Federal provisions for financing veterans' education, more than two million students will be crowding into these same colleges and universities. But, as I have said, in ordinary times about half of the young people who should and could profit society greatly by their continued education are denied college opportunities because of the expense involved. This is selling the Nation short with a vengeance. No investment we could make for a new world would bring greater dividends than would a generous investment in scholarships and fellowships for those within this group.

So much for a few of the quantitative aspects of educational improvements needed for postwar secondary education. But what of qualitative changes? Particularly, what of the curriculum of the high schools?

THE HIGH SCHOOL CURRICULUM

One approach to the problem of needed postwar changes in the curriculum of the high schools is to ask what weaknesses, if any, the war disclosed in the human product of these schools, and then seek to strengthen education at these points of weakness.

Such an approach discloses the need for improvement in the accomplishment of at least three objectives: (1) maintenance and improvement of the physical and mental health of students; (2) improvement of basic understandings, skills, and attitudes in the fields of language, mathematics, science, and the fine and practical arts; (3) strengthening of the civic and ethical elements of the educational program.

Health and physical education

During the war the Nation was shocked to discover that almost three million of its youth were physically unfit for military service. Senate Report No. 1497 said in this connection: "A large number of these [Selective Service] rejections were preventable and would undoubtedly have been prevented had a health program in the public schools of the Nation been adequately supported during the two decades prior to the outbreak of the war."

It is hoped that we may never need to prepare our young men to fight another war. But whether for war or peace, we certainly need to give greater place in the educational program of the future to physical and health education.

First of all, greater stress must be placed on a properly graded program of health instruction in the high schools, where the students have a sufficient mental and physical maturity to understand and utilize the wealth of modern scientific information which is function-ally related to healthful living. Secondly, sufficient gymnasium and playground facilities should be provided to permit a program of physical activities throughout the year. Thirdly, provision should be made for an annual medical examination of high school youth with a follow-up to acquaint parents with the results of the examination and to provide encouragement and assistance in securing such reparative or remedial work as may be indicated.

I would also suggest that the schools undertake to provide opportunities for students to attend school camps for at least one month each year. Although school camping is not exclusively a health education matter, it is a major help in building health and physical vigor. At present, the opportunity to experience the benefits of a well-directed camp is limited largely to children from homes of comfortable economic circumstances and to a very limited extent to children from economically underprivileged homes. I believe it is properly a project for organized education to provide these opportunities for many more children, especially those living in urban areas.

And finally, there should be provision made for a well-balanced noonday meal for every child in elementary and secondary schools. The passage by the Seventy-ninth Congress of legislation providing for the National School Lunch Program should go far to implement this proposal.

Communication skills

Improvement in basic skills in the field of language, i.e., reading, writing, listening, and speaking, is a perennial need which the war but served to accentuate. All communication skills are becoming increasingly important to the intelligent citizen, listening skills especially. Critical *listening* is an art to which the high school curriculum may well give more attention in a world in which radio broadcasts are daily heard by multiplied millions. Critical ***thinking*** is our only democratic safeguard against the domination of our thinking and feeling by various organs of mass communication.

I do not wish to confuse the idea of "critical thinking" with the idea of derogatory criticism of everything in American life. "Critical thinking" implies criteria or standards against which to compare and judge proposals. To aid students in formulating and understanding criteria of judgment is an important responsibility of secondary schools. Many of these criteria inhere in our ethical and humanitarian heritage as embodied in the classics of English and American literature. Others are found in our Declaration of Independence and in our Constitution. Against the ideals and moral principles of these and other documents we must critically judge proposals to fasten upon this country certain so-called "democratic" doctrines which have made slaves of millions in other countries; or other proposals that would sell our heritage of civil and political liberties for a mess of economic pottage. Against these criteria we must evaluate all slogans, catchwords, and stereotyped phrases.

Among the communication skills needed for a new world, mention is often made of the need of facility in foreign languages. How otherwise shall we understand other nations and people speaking strange tongues? But facility in the use of which foreign languages? Chinese? Russian? Spanish? French? And by whom are these foreign language skills needed? Shall *all* high school students become adept in at least one foreign language? And is the investment of the time of *all* students that is necessary to achieve real communication skill in a foreign language justified? If so, on what grounds? I raise the questions. The answers are by no means clear at this time.

Mathematics and natural sciences

I need say little concerning the basic disciplines of mathematics. Not everyone needs to pursue the higher mathematics, but everyone does have need for certain abilities in arithmetic and some understanding of the principles and a mastery of the simpler techniques of general mathematics. A major weakness in the work of the schools, according to military authorities, was our failure to require older youth to carry their mathematics to the point of reasonable mastery. Mathematical skills acquired in elementary schools were permitted by the high schools to vanish through disuse. The high schools must remedy this weakness.

Similarly, the wartime emphasis on the natural sciences must be continued. No adequate understanding of the postwar world will be possible without a knowledge of the natural sciences; and many careers in technical, professional, and scientific pursuits, whether of industry, business, or agriculture, are handicapped without it.

As I see it, some of the characteristics of high school science instruction for the new world will include: (1) greater attention given in laboratory work to the science applications in agriculture, home economics, industry, and so forth; (2) an attempt to interest all high school students in the study and use of science, special encouragement being given students with scientific aptitudes to continue their scientific studies beyond the high school; and (3) a larger use of films, excursions, and other means to provide greater reality to the science experience of students. High school science courses will become less bookish, less dependent on a single textbook.

Practical and fine arts

The practical arts will be given greater emphasis, for they will be depended upon to provide those elementary experiences in the use of tools, the processing of materials, and the shaping of means to ends which were once present in the daily life of youth living in rural communities but are now so largely absent from the environment of urban youth. Under the category of the practical arts I am including education for productive work or vocational education. Skilled workers will be required by the new postwar world, workers with a scientific understanding of their environment and with broad technical training. The days of narrow vocationalism in which a man learned a few operations of machine-tending are gone. Today workers need both general education to give them an adequate understanding of the world in which they live and special training to prepare them for their occupations. Increasingly, the latter will be started in high school and continued by training on the job or in post-high school special training courses.

Nor should we forget that in the postwar world there will probably be increased leisure, as the advances of technology make possible a shorter working day. Jobs will frequently fail to provide opportunity to use the creative talents. Men and women will need resources by which some of their leisure time may be used in such recreative ways as craft work in wood, metal, and plastics, painting, gardening, games, and music, as well as reading and study. Carrying forward the experiences of elementary education, the high school must provide the groundwork for such leisure-time and recreational interests and activities. Both the practical and the fine arts will have an increasingly important role to play in the personal cultural enrichment of youth and adults alike.

Social sciences

And lastly, I come to those basic understandings, attitudes, and skills which fall within the field of the social studies. The social studies will assume increasing importance in the high school curriculum for a new world, for it is on these that we shall continue to lean most heavily for the training of youth for their civic responsibilities. Chief among the social studies will doubtless remain the study of the history of our country and its institutions. Upon it we shall continue to depend largely for a grounding of our youth in the American tradition of economic, political, and civil liberty and for an understanding of our republican form of government.

But the study of the history of the United States can hardly constitute the beginning and the end of civic education for a new world. Young people must be taught to recognize and to think constructively about the major social, economic, and political problems which confront them as citizens of "one world"—problems of racial, religious, and other differences among men as they relate to domestic and international peace and security; problems of government in relation to labor and management, agriculture, industry, and the consumer; problems of foreign policy, world organization, peace, and many others.

We have heard a great deal in recent months about the postwar responsibility of the schools to provide a firm basis for international co-operation by an emphasis on the study of international relations. Not only will it be necessary to add to the subject matter of the social studies in our high schools material dealing with the mechanics of the United Nations, but it will be necessary to go beyond a study of such mechanics to a development of those underlying attitudes and solid understandings which are necessary to make any social machinery work effectively. The subject matter of international relations will involve at least four major areas: first, history with its account of the experiences of people in their long struggle for freedom and self-government; second, contemporary problems, requiring an understanding of the forces (economic and political, social, scientific, and ideological) which help to mold the pattern of events; third, political economy, requiring an understanding of the instruments which men have devised, their political forms and their social and economic systems, for protecting the rights of the individual and increasing his freedom through self-government; and finally, much knowledge concerning the different resources, customs, peculiarities, and cultures of other peoples, the possession of which will help to temper judgments and broaden sympathies toward all races and peoples engaged in the common enterprise of living together on a shrunken planet.

TEACHERS AND TEACHING METHODS

Last, but not least, among the needed qualitative changes in postwar secondary education to which I shall allude are changes in teaching method. Here, it seems to me, the need is for a greater utilization of methods that lead to a development of self-reliance and a sharpening of the student's desire to learn. One frequent criticism of our high schools is that so many youth leave without zest for continued learning. Perhaps one reason for this lack of zest for lifelong learning has been the continued prevalence, among many teachers and laymen alike, of the cold storage concept of education—the idea that education is the embalming in memory of a miscellaneous assortment of information supposedly valuable to the adult at some future time and place, as contrasted with the idea that education should be something related directly to problems and purposes which have meaning for youth here and now.

If interest is the key to learning and if interest inheres in purposeful activity, then the great task of teachers is to help youth to form and clarify their purposes; to guide them in their efforts to effectuate those purposes that are socially acceptable, whether the purpose is to publish a school newspaper, to operate a school-community cannery, to win a football game, or to make a new and better world; and in so doing, to promote the growth of the individual in intelligent self-direction and self-reliance in an increasing variety of real life situations. Incidentally, it is not unlikely that the student will acquire more genuine knowledge, better attitudes, and greater and more useful skills by such means than by much study of lessons for the purpose of reciting them to the instructor.

It must be obvious, of course, that if we are to have teachers qualified to act as inspiring educational guides for young people as they grow in wisdom and self-direction, we must make the profession of teaching more attractive. In the minds of some citizens, teaching is neither an art nor a science. They think of teachers as being merely "hearers of lessons." But teaching is both a great art and to a considerable extent a science. It calls for unusual skill and a personality whose interest and enthusiasm are radiated to the students in the teacher's charge.

One major item of change, in making the profession of teaching more attractive, must be the greater social recognition which the public concedes to teachers. That social recognition will take a variety of forms. One form will be a greater willingness to regard teachers as human beings, subject to the same impulses and entitled to the same personal freedom and respect as are other professional workers. Another form it must certainly take is that of greater financial security. The public can hardly expect talented young men and women to spend years in expensive preparation for the teaching profession if salaries are not to be substantially higher than at present.

CONCLUSION

In conclusion and by way of summary, the challenge of the new world to secondary education, as to many other institutionalized aspects of our life, is the old challenge of a sense of proportion in all things—of holding fast to that which is good, while adding innovating practices of promise. The challenge is for a program of studies and activities which does not ignore the claims either of a common citizenship and culture or of the individual student's hopes, abilities, and interests; for a teaching staff that can kindle the zeal of students and guide it into channels both of self-improvement and of social betterment; and for an administrative and fiscal structure that will make available to every youth his American heritage of educational opportunity.

These are the challenges to secondary education for a new world—a world characterized by complexity and change, by technology and specialization, by mass communication and swift transportation, by the impulse to greater unity, and, above all, by the sheer necessity of that unity if we are to escape the catastrophe of atomic warfare with its certainty of destruction for ourselves and for civilization. These challenges may not be met in a day or a month or a year. Making a new and better world will probably always be a slow and dearly won process of adaptation and accretion; evolutionary rather than revolutionary in character. Secondary education for the new world will be no exception. It will scarcely be transformed overnight. Yet if during the next decade we achieve these goals: (1) if we provide full and equal access to educational opportunities; (2) if we achieve a revised and strengthened curriculum; and (3) if we can count on better methods of teaching by a better-educated, better-selected, and better-paid teaching profession, we shall have made real and substantial progress in adapting secondary education to a new world. Thus we shall have made a contribution of no little magnitude to the building of a better world—a world of peace and plenty.

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Responsibility of Social Science

By Louis Wirth

EVER since the day when the people of the world heard the startling announcement of the destruction of a Japanese city by means of the first atomic bomb used in the history of warfare, a new bond of fraternity has been welded between physical and social scientists. Never before has the responsibility resting on social science for dealing with the impact of science upon society been as great. In the past, new scientific inventions and discoveries made their way slowly into the ways of living and into the minds of men. Social science was called upon to diagnose and, if possible, to treat the problems of society arising out of the attempt to adjust to, and to take advantage of, the impact of advancing technology. These problems, however, even in the case of the most startling technological innovations, took years and decades to develop to an acute stage, and there was time for the thinking of the social scientists, the statesmen, and the public to catch up with them. The problem was largely one of directing the new-found knowledge and power into beneficent channels with a minimum of disruption of the routines of life.

The problem posed by the discovery of atomic fission and the perfection of the atomic bomb differs fundamentally from the customary cases involving the impact of science upon society. Not only did the discovery of atomic fission come with startling suddenness, but the first utilization of that invention consisted of a dramatic demonstration of destruction on an unprecedented scale. We are therefore not dealing with a scientific discovery which allows us time for developing appropriate methods of adjustment; nor are we dealing with an invention from which, in accustomed leisure, we can extract only or mostly good without much danger of evil. Atomic fission, as it has emerged upon the world scene from the laboratory of science, allows us little time for thought, in part because it threatens our very life.

ATOMIC FISSION CHALLENGES SOCIAL SCIENCE

The fact that the world has not already been destroyed by this new weapon is no reason to feel confidence that it will not be. It is the responsibility of social science research not only to discover ways and means of preventing civilization from committing suicide by means of this new weapon, but also to discover ways and means by which the beneficent potentialities of this new discovery can be fully exploited.

The world has a right to expect social science to aid in solving the problems created by the impact of science upon society, for the problem of assimilating scientific discovery is a social problem, as even the physical scientists who have worked on the atomic bomb have clearly recognized. Social science might be expected, moreover, to have some experience to aid in dealing with this problem. There have been many instances throughout history, and especially modern history, when men have had to learn to adjust their social, economic, and political institutions and practices to newly emerging products of science and human ingenuity. The great social, economic, and political changes associated with the industrial revolution, for instance, have been studied intensively by social scientists, and even though these changes were less sudden and dramatic than the changes necessitated by the advent of atomic energy, they should offer some parallel from which men might derive knowledge and wisdom for guiding them through the present crisis.

If social science as it now is cannot help us in this predicament, then we must create a better social science that will be able to do so. The need for social science that will be adequate to our task is more widely recognized today than ever before. The tremendous contribution of scientific discovery and invention to our survival during the recent war, and the recognition of the discrepancy between the progress of knowledge of, and control over, the physical and biological world on the one hand and the social world on the other, account in large measure for the renewed interest on the part of our government in the establishment of a "National Science Foundation."

NATIONAL SCIENCE LEGISLATION

Proposals to establish a National Science Foundation have been before Congress for some time. The history of this abortive legislative effort[1] reveals some of the conditions under which social science will have to operate for a considerable time and some of the basic factors which may impede its progress. There is nothing new about government-supported scientific research in the United States. Franklin and Jefferson urged it, and our Constitution provides for it. Federal, state, and local governmental agencies have themselves for many decades carried on scientific research in many fields. The National Academy of Sciences was created by Congress in 1863, at Abraham Lincoln's request, to advise and aid the Government under a charter which gave the Academy a definite though restricted scope in the organization and application of research. During World War I President Wilson established the National Research Council to meet the needs of the Nation. When this country found itself confronted by a second world conflagration, President Roosevelt issued an Executive order establishing the National Defense Research Committee and later, in June 1941, creating the Office of Scientific Research and Development and a Committee on Medical Research.

The Office of Scientific Research and Development became the principal instrument for the mobilization of the scientific resources of the Nation in the interest of victory. The atomic bomb and radar are merely the two most dramatic contributions which stem from this effort. Toward the end of the war the OSRD, again stimulated by President Roosevelt, issued a report entitled *Science: The Endless Frontier,* which raised the question why the Nation should not reap the fruits of science as abundantly in peace as it had in war. Out of this report came the guiding principles which were embodied in a series of bills, the first of which was the Magnuson bill seeking to establish a National Science Foundation.

The OSRD report submitted by Vannevar Bush and the Magnuson bill enunciated the principles that the pursuit of science is of national concern; that scientists must be free to pursue their inquiries in their own way, and must be in control of the National Science Foundation; that the internationalistic tradition of science must be maintained and strengthened; that the wide dissemination of the findings of science, subject to the requirements of military considerations, is essential; that research should emphasize the fundamental rather than the applied sciences; and that the steady flow of trained young scientists to the laboratories and research centers should be encouraged by scholarships and fellowships. The social sciences, however, were not specifically provided for in the program of the National Science Foundation. The Kilgore bill, in its revised form as introduced in October 1945, attempted to remedy this deficiency. But when, after extended hearings, a combination of these and other bills, in the form of Senate Bill 1850, went through the congressional mill, the support for social science research was again eliminated, and the revised bill as a whole was defeated by the inaction of the Seventy-ninth Congress. Aside from the controversy centering around the inclusion or exclusion of social science, the congressional debate and the extended hearings held on national science legislation showed that the principal division of opinion rested on the role of the armed forces, the disposition of patents, and the details of administration.

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[1] *Hearings on Science Legislation,* Parts 1–5, Washington: Government Printing Office, 1946.

SOCIAL SCIENCE IS SUSPECT

In view of the history of government support of research, through the agencies already mentioned, through direct grants of funds to land-grant colleges, through the Department of Agriculture and the Office of Education, and by means of such indirect support as the collection of basic data by the Bureau of the Census and other agencies, it is appropriate to ask: What are the bases of the doubts entertained about the appropriateness of government support of social science research?

It has been suggested that the suspicion of Congress, which at least to some extent reflects the attitude of the American people, arises from the fact that during the period of the New Deal, "professors," i.e., social scientists, became the object of unfavorable publicity. One might think, however, that this negativism would to some extent have been overcome by the indispensable role played by social scientists in Washington and elsewhere during the war. This appears not to be the case. We must seek the basis of the generally hostile attitude toward social science research elsewhere. I suggest we look for it in the nature of social science itself.

Senate Bill 1850, even at that stage of its career when it was most favorably disposed toward social science, limited the role of the latter to "the study of the impact of scientific discovery on the general welfare and the social implications of other activities of the National Science Foundation." Social science was thus to be admitted to the household of science only after having undergone a shotgun wedding with natural science and technology. If the terms "impact" and "social implications" were interpreted broadly enough, much of the essentials of social science might have been conserved and advanced by the proposed legislation. On the other hand, the attempt to construe these terms narrowly seems to have been the obvious intent of at least some of the legislators, and might have resulted in confining social science to the relatively restricted zone of predicting and analyzing the impact of technology on social life.

GAP BETWEEN PHYSICAL AND SOCIAL KNOWLEDGE

Even if this limited scope of social science were to have been accepted, the social sciences would have had plenty to do. The most startling "impact of scientific discovery on the general welfare," to use the language of the Senate bill, is to widen the gap between available material power and the knowledge and wisdom to use that power in the interest of society. The destruction of an entire city by a single atomic bomb is such an instance. While from a military point of view the impact of this product of science upon the general welfare may be variously appraised, there is no doubt that it illustrated the trend of the increasing threat of material power to the bases of civilization. Events before and since that day indicate that there is no likelihood that the increase in material power will be retarded or blocked. Hence the only hope for mankind is to increase our knowledge and wisdom to control physical power. For the time being, we are in doubt whether the advancement of science and technology is a greater benefit than it is a threat to man.

The ever widening gap between the accelerated rate of progress in the natural sciences and the social sciences was sensed as a symptom of the impending doom of civilization especially around the turn from the nineteenth to the twentieth century. Many writers a generation ago, among them Henry Adams, virtually despaired of man's capacity to cope with the revolutionary changes in the physical world generated by the progress of science and technology. In the light of what has happened in the few decades since this pessimism found its most articulate expression, the views expressed at the beginning of this century seem decidedly conservative.

At first glance, the perilous prospect of man and civilization appears to be a contest between science and the control over science, between knowledge and morals, or, as we have sometimes heard it described, a race between education and catastrophe. Upon further reflection we find, however, that the science with which the late prophets of the suicide of civilization and, we might add, the Seventy-ninth Congress were concerned was not the whole of tested and organized knowledge and human wisdom, but merely that segment of it which enables man to understand and manipulate the physical universe. It did not include such ordered and reliable knowledge as we have and might obtain of the human and social universe, which, if it is not science in the strict sense, is at least closely akin to it.

FRUSTRATION OF TECHNICAL PROGRESS

What threatens us is not either science or the power built on science, but man's use of that science and power. We have made enormous progress in the technology of warfare, but we are only in the first stages of a corresponding development which will make war itself obsolete. We have advanced fantastically in the techniques of primary production, but we have allowed to develop a vast and expensive apparatus of financing, management, distribution, and promotion which robs us of much of the economies created by industrial technology, not to speak of the waste and retardation in the optimum application of our industrial technology by the frustration of ownership, by monopolies, vested interests, seasonal and cyclical unemployment, trade barriers, and nationalism.[2]

The social potentialities of scientific developments are at least to a considerable degree stifled by the economic, social, and political arrangements which retard the full utilization of scientific discoveries in every sphere of life. Herein lies one of the first tasks of social science, for unless the social scientist is enabled to show how society blocks the progress and utilization of science, in the long run science will become the enemy of society and will be reduced to a futile exercise, or there will be no science at all.

VESTED INTEREST AND DANGEROUS THOUGHT

The grudging recognition of the importance of social science research and the relatively meager support it has received are due, then, at least in part, to the fact that in dealing with the predicaments arising out of the more rapid progress of physical science as contrasted with that of social science, the social scientist is compelled to scrutinize our traditional and existing institutions, practices, and values. To do so is to court the displeasure, if not the outright hostility, of the dominant elements in society, especially those who have a vested interest in things as they are.

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[2] One need only study such recent official documents as the reports of the Temporary National Economic Committee and the Kilgore and Bone Committees to appreciate how little of our industrial potential we actually use and the forces that are responsible for this prodigious waste.

Social science research thus always threatens to become "dangerous thought." Considering that the controversial issues arising in a society are the stuff out of which political cleavages are made, it is doubtful whether the political bodies which must ultimately decide to support or not to support social science research can be relied upon to direct substantial public funds to the objective investigation of problems without seeking to control the outcome of research. Highly abstract and abstruse theoretical inquiries which do not bear immediately on public policy formation may, of course, find some support, as may the collection of routine factual information such as the census provides. But we have seen recently how even the presumably objective inquiries into wages, prices, and the cost of living under auspices of the United States Bureau of Labor Statistics can become the subject of political controversy. We might as well reconcile ourselves to the fact that in social science only the innocuous and the irrelevant are completely neutral. The scientific investigation of significant social problems must run the gauntlet of those who have a stake in the discovery and dissemination of the facts and their interpretation.

SOCIAL SCIENCE VERSUS COMMON SENSE

The failure of social science to gain wide public acceptance is also in part attributable to the fact that social scientists have not been very successful in convincing the public of the difference between social science and common sense. Since the problems with which social science deals appear to be the same problems with which the ordinary citizen must also struggle and on which he must arrive at personal decisions, it is assumed that the conclusions of social science research are nothing more than the personal opinions and prejudices of social scientists disguised in erudite and unintelligible verbiage. The findings of social science are sometimes regarded as elaborate statements of what everybody knows in language that nobody can understand.

If social science research is to make its optimum contribution to the solution of such problems as arise out of the impact of science upon society, it must, of course, make its findings intelligible to, and find suitable means of disseminating them among, the leaders and masses of men. Unlike the discoveries of physical science, however, which in so far as they affect human behavior do so mainly through inventions which are diffused through agencies such as the market, the discoveries of social science affect human behavior through the ideas and ideals of men and must, therefore, gain acceptance through communication, persuasion, and other social-psychological means.

Much of what is sometimes called social science is, in fact, indistinguishable from common sense and the rationalizations of personal opinions and prejudices. Because of the very nature of its subject matter, social science probably will never achieve the impersonal character of physical science. But, given favorable conditions, knowledge of the social world should in time come to approximate the criteria of scientific knowledge of the physical world. Making due allowance for the marked differences between the two fields of knowledge, such a state of affairs will be facilitated if the distinctions between the methods and objectives of social science and those of common sense are clearly recognized and popularly understood.

Without pretending to exhaust these distinctions, at least the following differences may be noted: First, whereas common sense tends to treat a situation as unique, social science regards it as generic and thus deals with it comparatively. Second, whereas common sense is inclined to approach a phenomenon as more or less fixed, social science views it genetically and seeks to describe and analyze it as a process. Third, whereas common sense takes a relatively restricted view of a fact or event, social science seeks to comprehend it in its wider setting and to look for multiple rather than single causative factors. Fourth, whereas common sense tends to be moralistic in its approach to a problem, social science tends to be naturalistic. Whereas the one seeks to assess praise or blame, the other is in search of understanding and explanation. Fifth, whereas common sense is either fatalistic or reformistic, social science is looking for tenable generalizations and predictions and is searching for the conditions under which a given situation can be altered by rational means. Sixth, whereas common sense consists of empirical wisdom which tends to crystallize into proverbial and dogmatic formulas which are cumulatively strengthened by experiences which happen to confirm the original belief, social science is tentative and hypothetical in the formulation of its findings and is constantly on the alert for negative cases which contradict its generalizations and which necessitate a reformulation of initial hypotheses to take account of the new findings. Seventh, whereas common-sense knowledge is more or less discrete, social science strives to achieve a logical ordering of its findings and a maximum of systematization. And, finally, whereas common sense is blind to, or rarely conscious of, its biases and values, social science attempts to make its premises and unstated assumptions explicit.

If the public can be convinced that these differences are genuine, the notion that social science has something to contribute beyond common sense may find wider acceptance. No amount of aping of the methods of the natural sciences or attempt to bask in the reflected prestige of the natural sciences will be sufficient. It is the works rather than the words of social science that will bring about the desired change.

NEEDS OF SOCIAL SCIENCE

It would be futile to argue that social science has had the same opportunity to develop as has physical science and has had the same support. It is, of course, true that the physical sciences have had to overcome some of the same obstacles which have impeded the progress of the social sciences. The former have overcome these obstacles fairly successfully and fairly early in the history of the physical sciences. This was due in part, however, to the relatively impersonal and objectifiable nature of their subject matter and because of the generous support which they were able to attract by virtue of their immediately demonstrable usefulness.

The social sciences, on the other hand, because of their entanglement with the sacred religious doctrines, and because of their bearing on the established value system, interest groups, and power relations of society, have attracted a disproportionately small amount of support. The insignificant amount of support they have received has in turn resulted in a correspondingly limited amount of effort. It can be said that for every important problem in the natural sciences there are available many times as much money and many times as many workers as there are for every equally important problem in the social sciences. As the impact of science, i.e., the natural sciences and their attendant material innovations, has been increasing at an ever quickening pace, the recognition of the importance of, and the social support given to, research on the problems created by the impact of science has lagged. This lag now threatens to overwhelm civilization.

The mere availability of financial support, however, will not be sufficient to overcome the difficulty created by the quickening pace of natural science and technological progress. Social science research will have to learn to use the available resources more effectively. The effort to collect the basic social data will have to be greatly extended and improved on a world-wide scale. There is no prospect that the collection of mass data on a national and cosmic scale, even with scientific sampling procedures, can be accomplished without substantial public aid and probably governmental responsibility. There will be need for attracting more potential research workers of talent to the social sciences. This will call for the creation of opportunities and rewards comparable to those existing in other fields. The organization for productive research in the social sciences is still primitive, and the communication system by means of which research efforts might be integrated on a national and world scale is in its merest beginning stage. Planning of social science research has hardly begun. Methods of education and training for social science research are still crude. In many parts of the world, and in many fields of social science interest even in the United States, there is not the atmosphere of freedom and encouragement which is essential for all science, and especially for social science. Finally, there still must be cultivated more widely among social scientists a love of science, a love of mankind, and a sense of social responsibility.

SOCIAL SCIENCE AND SOCIAL PROBLEMS

Assuming that social science had the necessary resources, the necessary conditions, and the necessary personnel, it remains to indicate the problems to which it would address itself and the social consequences that might be expected to flow from this effort. It is sufficient for our purposes to say that the object of social science is to understand social life and to discover the means for its control. We start, therefore, with social reality. But the question soon arises: At what level shall we start or stop with the analysis of that reality? It is possible to obtain valid knowledge concerning that reality which would be so generalized and abstract that the truths thus found would scarcely be a valuable guide for action. Thus the social scientist might discover much that is true without being able to communicate anything to others that would be relevant to the problems of living. It is well to remind social scientists, therefore, that while theoretical pursuits may be among the most important preoccupations of all science, including social science, the test of their significance and indeed their validity consists, at least in part, in the power of understanding, prediction of, and control over, some area of reality, which, in the case of social science, means some aspect of social life.

It should also be noted that as in all science, so in social science we note the tendency toward specialization. The social sciences today are not one, but many. Each individual discipline, be it history, psychology, anthropology, sociology, politics, or economics, has come in the course of its differentiation to adopt a conceptual framework, a set of problems and methods, and, indeed, often a subject matter of its own. This fragmentation of social science may itself come to stand in the way of a comprehensive perception of social reality. What is true of social science as a whole is also true of the individual social science disciplines.

It is not always possible, therefore, to move directly from the minuscule researches of the social sciences to a scientific attack on a social problem. No matter how valid the conclusions of a minute piece of social research may be, it still remains a most necessary task to relate it to the total body of knowledge which will be adequate to comprehend a real social problem. For many practical purposes, the answers we obtain from highly fragmentized research are virtually useless. Social science research must, therefore, in the long run discharge its social responsibility by answering the larger and more important questions which society raises.

Social problems, moreover, do not arise from the nature of things. We speak of those situations as social problems which we recognize as unsatisfactory and as subject to remedial action. Social problems are situations which deviate from accepted norms and fall short of expectations and possibilities as we see them in the light of what once was, what exists elsewhere, and what we think is possible with our knowledge, power, and resources. A situation is not a social problem if we cannot imagine it different from what it is and if we see no way of changing it. Social problems always involve social values. Hence social science can never escape from dealing with values. This complicates the work of the social scientist enormously, but it also gives his work its strategic social significance.

SOCIAL PROBLEMS AND THE IMPACT OF SCIENCE

The impact of science upon society has been responsible for creating many of the problems with which the social scientist is called upon to deal. It would take much more space than is available even to recount some of the more important of these problems; for whenever a new invention appears on the social scene, it tends to upset the existing equilibrium and set in motion a chain of social adjustments which may alter the structure of the whole society. This has been notably true of such innovations as gunpowder, the microscope, the telescope, the steam engine, electricity, modern chemistry, medicine, mechanics, and biology, among many others. Merely to indicate the nexus between a scientific discovery or invention and the subsequent changes that were provoked in society, we may mention the relationship between the harnessing of steam power and the impetus this gave to the rise of modern capitalistic urban industrial civilization, mass migrations, changing class structure and form of government, the democratization of culture, and the spread of leisure and the problems of what to do with it. Or one might take the scientific discoveries underlying the development of the radio, and their connection with the problems of mass communication, of propaganda and the world-wide spread of ideologies, the awakening of "backward" peoples, and the battle for world public opinion which seems to be emerging.

Even common sense should have taught us that social institutions do not automatically adjust themselves to scientific and technological innovations. And yet it is virtually impossible to think of a single scientific discovery, the consequences of which were studied systematically and planned for in advance. It was not done in the case of steam power, electricity, the automobile, the radio, or the airplane. There appear to be some signs, however, that in the case of atomic energy we may be compelled to make provisions for the reception of the discovery by society at an earlier stage and with greater speed. The potentialities both for destruction and for a higher form of civilization dictate that all the resources of knowledge we have be employed in exploiting and harnessing this new scientific discovery. The knowledge requisite to the building of a world community and of world government, to mention only one aspect of the social situation created by the discovery of atomic fission, has become indispensable for the survival of civilization. The dilemma of good and evil which this new discovery poses for mankind may even become the catalytic agent for the development of a more adequate and publicly supported social science.

SOCIAL SCIENCE AND POWER RELATIONS

If social science in the atomic age is to meet the needs of mankind, it will have to overcome an important deficiency: In the past social science has so frequently fallen short of its potentialities because after having analyzed a problem and projected the policies that would bring about the desired change, it became painfully obvious that the social scientist lacked the power to persuade or compel others to put his program into operation. Research in the social sciences will remain stunted and inadequate until it includes the search for knowledge on power relations among men and the means for generating the will and the capacity for action directed toward the achievement of a good society.

No one can give the assurance that with adequate support and a favorable atmosphere social science will succeed in coping with the impact of science and technology in time to prevent the destruction of civilized life on earth; but, as William James has pointed out, not the assurance of success, but the mere chance of success, is enough to justify the effort and to motivate the most strenuous and sustained endeavor. If what science has taught us in other realms is true—and it is all too visibly true—there is no alternative road we can travel.

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Security, Freedom, and Modern Technology

By William Haber

HUMAN progress has been marked by man's striving for security and freedom. At one period or another in history the struggle for freedom appeared to predominate. For centuries men have sought escape from oppression and tyranny, and freedom to worship, write, and speak as they think; to meet together and protest a wrong; to vote and change their government. The quest for civil and political liberties has been of primary concern for countless millions all over the world. In many lands the contest to achieve these liberties is still on; in others it is just beginning.

Economic freedoms have played an increasingly important role in the struggle for the broader freedoms. These have included the right to join unions, to quit one's job, to strike; the right not to work, and the more persistent and less easily achieved right to work; freedom to choose one's occupation, to change jobs, to invest one's savings or to keep them idle; freedom from unfair competitive practices, economic oppression, and government competition and government regulation; that is, the protection of free private enterprise.

Freedom in its simplest terms has been defined as "ability to do what you want."[1] But freedom for everyone to do what he wants is not necessarily the sole purpose of organized society. It is obvious, of course, that if everyone exercises this privilege, the freedom of many others may be severely curtailed. This is especially true in regard to the economic freedoms. With the right to join unions has been associated the right not to work alongside those who choose not to join such unions. The right not to work, when exercised collectively through strikes, deprives millions of other individuals of essential services and may deprive them of their freedom to go about their daily affairs unmolested. The right to choose an occupation may lead to overcrowding of certain occupations and professions and endanger the standards of all. The right to withhold one's savings from investment may lead to joblessness and low wages. Here are obvious conflicts of rights.

Since not all freedoms are of equal importance to each of us, we begin to establish priorities, indicating those freedoms which may be compromised or curtailed in the interest of a greater freedom for ourselves or others. Such compromise is decidedly dangerous, for by it we discard the idea that all forms of freedom are inalienable and seriously restrict certain specific types of freedom. And the idea of priorities obviously suggests that someone will have to determine the relative importance of certain kinds of conduct.

THE GOAL OF ECONOMIC SECURITY

The driving force in this ideological revolution of freedom has been the desire for security. Hunger and poverty, unemployment and low wages, and economic oppression and job insecurity have long been recognized as serious obstacles to freedom, although "freedom from want," to name but one of the Four Freedoms of this day, was not consciously considered to be one of the essential objectives in the quest for freedom a century ago. In this decade it became a major slogan in the world's greatest war, a plank in the Atlantic Charter, a goal of the United Nations.

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[1] Barbara Wooton, *Freedom Under Planning* (Chapel Hill: University of North Carolina Press, 1945), p. 4.

The challenge confronting the twentieth century is that of universal economic insecurity which subverts the very freedoms won in past centuries. The scars of depression and unemployment have cut deeply and millions of people seriously question the economic basis for personal and social security. Many in this Nation are of the conviction that the preservation of our democratic institutions depends upon our ability to manage our affairs so that the vast majority of the population is protected against the hardships of unemployment, old age dependency, illness and disability, and to this end social institutions and programs have been fashioned.

Is there a conflict between the quest for security and freedom? Is security to be won only at the price of liberty? Is planning for security the road to serfdom? Is freedom possible under planning? Next to the problems of war or peace, the central issues in our democratic society grow out of our efforts to shape our social and economic institutions so as to provide maximum security without compromising our basic freedoms.

SCIENCE AND SECURITY

Science and modern technology have a great role to play in man's search for both security and freedom. The wartime role of science has focused public attention on scientific development, brought forth unprecedented funds and public support, and stimulated research on a national and international scale. The ever increasing industrial application of scientific discoveries will influence men's lives and livelihood to an unparalleled degree. Will it be a bane or a boon? Will it make for bigger economic cataclysms or contribute to the control or elimination of depressions? Will it ease the life of the toiler, raise the standard of living of the mass of workers and increase economic security? From a scientific point of view, the possibilities are fantastic!

The scientific revolution has given man power to manipulate material things to a degree never before dreamed of. It has made it possible and imperative that he change his former way of living and self-maintenance, his manner of farming, manufacture, travel, and communication. These are fundamental changes, many of which have occurred in the short period of less than two centuries and the most significant of which, in fact, have come about in very recent years. The far-reaching changes have so enlarged man's knowledge of this planet and the utilization of its resources as to make attainable the creation of a new world of rich possibilities. The fear of war, growing out of the invention of the atomic bomb, has, for the time being, overshadowed the hope that scientific discoveries, especially of the revolutionary character of atomic energy, may vastly enrich human life. Science is rendered suspect when it is used to produce horror rather than happiness and peace.

The scientist in the laboratory has played a vital part in the building of modern industrial civilization. Man's greatest hopes in conquering the giant evils of disease, malnutrition, and poverty are founded upon the contributions which could come from scientific research. But not until the pulverization of the Japanese cities by atomic bombs on August 6, 1945, did we realize the power, the opportunities, and the dangers inherent in such investigation. From that moment science and research became the tools of government. The progress of science and the advance of civilization have always been intimately interwoven. The relationship has now become positive and direct rather than incidental.

The technological developments resulting from scientific discoveries have released millions of workers from the production of the basic necessities of life, increased the productivity of farms, mines, and factories, and raised the standard of living of this and many other nations. Thus there has developed in the United States an economic civilization which produces all of its foodstuff with less than 20 per cent of its employed population and which engages a lessening number of people in manufacturing and more and more in providing services. A progressive technology is sifting increased numbers of men and women into the expanding professions in the school and church, public health and social security, recreation and entertainment, the fine arts and the sciences. But we stand merely on the threshold of great advances. Not tomorrow or the next day, but in the next generation the application of the findings of science will ease the problems and burdens of life.

POTENTIAL ABUNDANCE

The economic consequences of the scientific revolution are made manifest in the volume of goods and services produced, the kind of work people do for a living, the length of the work day and work week, and the possibilities of economic security. Men have always struggled to provide the necessities of life. Their economic security and standard of living were circumscribed by the limits of industrial technology and more production rather than more equitable distribution was the needed weapon in the battle against poverty. This is no longer true today and, confining my analysis to the United States, in physical and engineering terms an era of scarcity in this Nation is an anachronism. The solution to the quest for more goods is known. Modern technology has made an era of economic abundance a practical possibility. The practical abolition of poverty depends upon the ability and willingness of men to perfect the institutional arrangements which make possible the full utilization of human and physical resources. Our war experience provides conclusive evidence that, given the incentives, we have the capacity for a standard of living such as appeared utopian only a few decades ago.

Full employment during the war years indicated the possibilities of the application of modern technology to production. We learned that the production of goods and services needed by the people is limited only by the capacity of the Nation's technology and the willingness of men and women to hold jobs. We learned that a national income goal of 100 billion dollars, which seemed a desirable objective to the National Resources Planning Board in 1939, could be achieved easily and even surpassed. Thus in 1945 the value of our national production approximated 200 billion dollars—almost four times the 55-billion-dollar value of our national production in 1933. Such a volume of production in peacetime makes possible a phenomenal increase in the quantity and quality of goods and services, food, clothing, and shelter, and in the amounts available for education and health, recreation and the arts. Modern methods of production applied to industry have resulted in phenomenal increases in productivity in the manufacturing industries. Applied to agriculture, although fewer acres were plowed in the United States in 1942 than in 1918, 50 per cent more food was raised in the later year in the largest and most diversified crop ever harvested. Employment in the professional and service occupations has been expanding steadily since 1900, while during the same period millions of workers have been released from agriculture, and manufacturing has had less than a proportional increase in employment. An increasing proportion of workers are employed in large enterprises. The opportunities for independent work have been diminishing, largely because of the decreasing number of persons who make their living in agriculture. Hours have been steadily reduced and the 8-hour day, 5-day week is becoming the standard work week in most of our industries.

AN UNSTABLE ECONOMY

A society of abundance has not been achieved in spite of this country's technical capacity to accomplish it. A large proportion of our people have less security, less time for unworried living than their fathers or grandfathers. We have failed by a wide margin to provide security and a standard of living made possible by our resources. Our economic system is not built for stability, and unemployment is still the outstanding economic problem of our age. Full employment during the war and postwar transition period is recognized by all as a special situation, induced by government spending. And the postwar labor shortage is not assumed to have more than temporary significance. Sooner or later we shall return to the employment fluctuations and instability which characterized our economy in the prewar era. Thus the paradox of poverty and destitution for many, job insecurity and low standards of living in the midst of possible abundance. The United States has developed a highly industrialized and urban economy. The great proportion of its people depend upon jobs as their sole source of income. The existence of jobs depends upon decisions made by others, by thousands of individuals who are willing to take the risks without which production will not be carried on. The prospects of profits are influenced by a complex of competitive, political, and international forces—forces often not subject to the control of the employer upon whose decision the jobs depend. Our job economy is therefore an unstable economy. Twice in twenty-five years, and in both instances as a result of a world war, have we had full employment.

In many respects the instability is accentuated by the technological developments which are an outgrowth of the scientific age. These developments, for example, have made possible a steady and often relatively rapid increase in productivity and a resulting reduction in consumer prices. Unless we are prepared to deal rapidly with the increasing frictions created by monopolistic institutions, whether of businessmen or labor, which block necessary and possible price reductions, the economic consequences which follow only aggravate the problem; prices fail to fall, demand declines, and unemployment may increase. We rely upon competitive forces to create necessary adjustments. We assume that equilibrium will be established at full employment of our resources and manpower. What is often overlooked, however, is that the very economic forces which are supposed to maintain such an equilibrium and provide necessary adjustments in prices are being increasingly weakened by counterforces and institutions, some of which are created to protect society against the effects of technological changes.

Such counterforces are manifested in the increasing rigidities in the wage structure; the effect of collective bargaining and union methods in resisting wage deflation; the effect of unemployment compensation benefits upon similar resistance to "adjustments," and upon labor mobility; the influence of "administered prices," made possible by the increasing size of the business unit; the role of the monopolistic or semi-monopolistic industries; the influence of government wage controls and minimum wage regulation; and the increasing acceptance of "price stability" as necessary if serious production fluctuations are to be avoided. "Big Labor" and "Big Business," both products of modern technology, are increasingly capable of resisting changes and adjustments which are likely to affect them adversely. All of these make for less flexible economic institutions and greater difficulty in bringing about adjustments. Since these controls are not uniform in all areas of economic activity, the possibilities of disequilibrium are greater than ever. Our system of free private enterprise is much less free than is generally recognized.

SOCIAL LAG

The social institutions of government, business, and labor need to be as flexible as the institutions of science. Science is dynamic; no ideologies stand in its way. New discoveries replace the old. There is a premium on experimentation and discovery. Our social institutions, on the other hand, are relatively rigid. By their very nature they are conservative. Change is resisted. Ideologies are of vital importance. Labor, employer, and citizen opposition all conspire to stand in the way of the institutional adjustments which are necessary if full utilization of our resources is to be achieved. Full employment, for example, must necessarily be examined not alone as a technical proposal, but in relation to its ideological consequences, its effect upon free enterprise, government control, freedom to invest, and free collective bargaining.

In part then, our difficulties flow from the lag which exists between technology and our political and economic institutions. This lag is inevitable because our institutions are obviously the product of our history, ideals, and beliefs. We change our institutions slowly, and only when our ideals appear to be endangered by our failure to change.

THE ROLE OF GOVERNMENT

The quest for security and job stability—the central problem of this generation—has led to a larger degree of government planning than the people of the United States have ever experienced in time of peace. Our experience during the two world wars indicates that we have the technical and administrative know how and the human and physical resources to provide the physical and cultural needs of our people on a higher standard than we have ever before known. Our mass production methods and capacity must be matched by a program to provide mass consumption if industry is to operate steadily at a capacity rate.

Our experience thus far suggests that the full utilization of our economic resources must be planned. It won't just happen, except for a time. Equilibrium is temporary and may, in fact, be achieved at a point considerably below the full use of the Nation's industrial facilities and resources. Government must act positively in such an undertaking. It must not wait for disaster, but must underwrite the demand for goods and services for the entire population in such a manner as to assure a market and thus stimulate risk-takers to produce. The danger of a negative role, of waiting for the collapse of markets and unemployment, is too great. A peacetime incentive as forceful and compelling as war must be found for the successful achievement of full employment.

The backlog of unfilled orders, of productive work representing unfinished national business is tremendous. In the field of housing there are long-range obligations and opportunities. Nearly one half of our houses are below minimum standards, deficient in the basic requirements of light, air and room. Slum conditions are found in every city in the land. There is need for some eight to nine million housing units to replace old ones; five to six million additional units to make up for the wartime lag in housing, for the increase in population and new families. Only a full employment economy can make possible an expenditure of 8 to 9 billion dollars a year for such a purpose. The role of government is to stimulate the entire program, but particularly to help low-income families obtain decent houses. One third of the housing needs are estimated to be for families which cannot pay more than $30 per month; another third have monthly rental limits of $30 to $50. Private construction enterprise must be relied upon to restore and maintain the Nation's housing, but government aid is needed both in planning and in subsidizing housing for low-income groups.

The Nation's obligations and opportunities in the field of health are also large. Sickness and disability in the United States, despite incomparable skill and achievement in medical science, represent a colossal waste of manpower and resources. The findings of the local Selective Service boards that about 40 per cent of the registrants were unfit for military service represent a measure of the task before us. More doctors and dentists are needed. Services in hospitals and clinics must be expanded; investigation and research increased; and good public health service extended throughout the Nation. And the financial hurdle which stands in the way of needed medical services for millions of people must be overcome.

The frontiers can also be pushed back in our natural resources. Our river valley developments offer rich opportunities for exploiting a wasted natural resource, raising the level of living for millions by land conservation, forest development, rural electrification, and providing productive work opportunities for an estimated one million men for more than a decade. The Government has a responsibility in stimulating private investment in all areas through credit policies and the maintenance of maximum competition consistent with economic stability.

Our social security structure must be enlarged with universal coverage for the major economic risks faced by an industrial population. Some of these risks, such as illness and disability, are not provided for in our present scheme; for other risks the benefit scale is admittedly inadequate and the coverage restrictions exclude nearly one half of our labor force. We insist, and properly so, that the employer, in the interest of maximum efficiency, should be free to dispense with a worker's services at any time. We encourage technological improvement with its consequences in labor displacement. We cannot shirk our obligations to provide a minimum income to those who pay the price of freedom to hire and fire. In fact, a comprehensive and adequate social security program is the simplest way for a dynamic society to pay for the cost of change and reduce resistance to scientific developments and their technological consequences. Since jobs are the sole source of income for most people, and since job security is still an elusive goal, security of income, or at least partial income, is the simplest method of dealing with the major consequences of instability which is the product of economic freedom. To be sure, a social security program further extends the role of government in economic affairs.

These are bold commitments—peacetime planning on a grand scale. The firmer the undertaking to underwrite the market, the less government is likely to be called upon to meet it. The assurance of a sustained market can provide a firm base for business operations and make possible long-range business planning and production.

THE PRICE OF SECURITY

Economic security cannot in itself create freedom, and economic abundance does not necessarily result in the good life, or lead to a democratic society. These are not in themselves adequate to create a free society in the United States. They are, however, essential, if not indispensable, for such a community. Without economic security, a high national income and an expanding economy, the "good life" and the "good society" in a highly organized industrial and urban civilization will have no chance. Unemployment and insecurity, low income and poverty, a static and contracting economy are a certain road to reaction and to the curtailment of the very freedoms we wish to preserve. The quest of the social scientist must be for an alternative which provides a maximum of security and at the same time preserves the essential liberties without which we will lose both freedom and security.

What is to be said of "the road to serfdom," of the fear that in expanding the role of government in the field of economic affairs, we shall be creating an omnipotent state?

Such dangers must be seriously considered. The alternatives are not between social anarchy and political totalitarianism. The choice is not between planning and utopia. There are hazards in either course we follow. There is a balance, which must be discovered by democratic experimentation, to determine in each instance to what extent we are willing to curtail established freedom of action for a greater good. Full employment in a free society is possible, but we must recognize that in such a society everyone is not free to do what he wants.

The realization of full employment would in some measure restrict the freedom of private enterprise and the direction and perhaps the location and volume of investment, and extend many encroachments already established. It would undoubtedly involve an extension of public control over the labor market. Such controls need not be as drastic as those which restricted the choice of occupation and labor mobility during the war, but would probably extend considerably beyond the prevailing regulation of the labor market. This may call for some form of control and guidance of labor mobility, job registration, notification of vacancies, and choice of occupation.

A full employment plan may also involve decided restrictions on the freedom of collective bargaining, especially as it influences the regulation of wages. If planning for security and full employment involves a conscious determination of production goals, it follows that competitive wage rates cannot be permitted to draw labor away from high priority programs. The Beveridge analysis emphasizes that if full and free collective bargaining is retained, the attitude of the parties to the bargain must be changed from that which prevails at the present time.[2] "All the familiar methods of adjusting wages are quite inappropriate to the demands of economic planning."[3] One need not decide whether the alternative to the tussle over wages is some form of voluntary arbitration or legal regulation, or a reliance upon the wisdom and self-discipline of the parties involved. It is only necessary to indicate that if security is our goal, certain accepted forms of individual and group conduct will be seriously curtailed.

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[2] William H. Beveridge, *Full Employment in a Free Society* (New York: W. W. Norton & Co., 1945), pp. 198–201.

[3] Wooton, *op. cit.*, p. 115.

There is little or nothing in the proposals for planning for security and full employment which endangers the freedoms upon which we rely most—the civil and political liberties, the free choice of our cultural objectives, the right to exercise our freedom as consumers, the right not to work. These need not be endangered by planning for full employment and economic security. Failure to plan in this age of unexampled scientific development and technical change may, in fact, expose our freedoms, civil, political and economic, to a greater danger—institutional insecurity which is the inevitable concomitant of unemployment and poverty and underutilization of our manpower and resources.

Fortunately, the choice is not to be made suddenly or by violence. Our institutions are not fixed and eternal. They have been changing since the founding of our Nation, hammered out by experience and modified and adjusted to conform to the requirements of changing times and conditions. That process of institutional change is fortunately still continuing. Modern technology has but increased its tempo.

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The Humanities in a Scientific World

By Hayward Keniston

THAT we live in a scientific age and and that science and its by-products have had and will continue to have a profound effect on society needs no demonstration for many of us. And some of my readers may believe that we must look to science to solve the social problems that beset us today. I propose in this article to express the conviction that science cannot, by itself, solve any of our major human problems—individual, social, national, or international. The only hope for a better world lies in the progressive ennoblement of the individual human spirit. For that ennoblement we must look to philosophy, the arts, and religion—the fields of experience which we call the "humanities."

The founders of modern science, the great astronomers of the sixteenth and seventeenth centuries—Copernicus, Tycho Brahe, Kepler, Galileo—could not have guessed (though Mother Church may have had an inkling) that their theories and discoveries would so radically alter subsequent thought and life. Reduced to a mathematical, quantitative expression by Sir Isaac Newton, and extended from the physical to the biological world, the scientific method led to an extraordinary increase in man's knowledge of the physical characteristics of the world in which he lived. By the end of the eighteenth century men were beginning to apply this new scientific knowledge to the invention of machines, and a new age resulted—the "machine age." It is not necessary to relate what the effect of these machines has been, or how steam, gas, electricity, and radioactivity have provided instruments that are essential, we think, to our comfort and health. We live, move, and have our being in a world of gadgets.

Not all the results of science and its machines have proved beneficial, for science is by its nature primarily concerned with material things, and as modern invention multiplied the number and variety of things available to the average man, he acquired a new set of values; the possession of things became an increasingly dominant goal. How that central obsession is reflected in the moral, economic, and political attitudes of contemporary society is recognized by many thinking persons. Why may we not turn to science to help us solve these problems?

THE CHARACTER OF SCIENCE

Perhaps I had better examine for a moment the essential character of the scientific method. It consists, in the broadest terms, in the observation and classification of data. Its classifications are based on an asumption, a hypothesis. The validity of the hypothesis is tested experimentally, and if the data verify the hypothesis we may state a general principle which describes all the data observed. The old notion that science can discover universal "laws" is no longer held by modern scientists; rather, its statements of theory are valid only within the range of data observed. We must go back to the principle which Aristotle dimly discerned—that the task of science is to establish statistical norms within a given field of observation.

Now there are certain considerations which derive from the special character of science. First of all, the scientific method is most effective when its data are concrete, simple, and constant. This explains why scientific progress in the inorganic world of the physical sciences has been more rapid and of higher predictive value than that in the organic biological sciences, where the data are both complex and variable. In the second place, it should be remarked that, in spite of all the engines and instruments that have emerged from scientific discovery, science is in essence pure theory; theory based on material entities, it is true, but none the less theory. Recent nuclear physics, for example, has passed into a realm in which it is impossible to represent in material terms its theories of mass and energy. Is it not incredible that out of so remote, so meaningless—at least to me—an inquiry there should have come an atomic bomb?

One other characteristic of science deserves mention. Science seeks to describe, to answer the questions What? and How? Whether its data are synchronic or diachronic, it cannot answer the question Why?—to what end or purpose? Neither its content nor its method is adequate or appropriate for teleological considerations. For them we must look to other intellectual disciplines.

THE PRESTIGE OF SCIENCE

The progress of science has been so rapid and its derivative contributions to human life and living so amazing that its techniques have acquired an overwhelming prestige. They have been applied during the last century to every phase of human life. Is it not typical that we should talk about the social "sciences"? Clearly the collection and organization of data concerning social institutions are fundamental. But these objective data alone can never solve the ills of society. The great issues we face in society are those that the individual faces: moral values, purposes, ideals. And with these science can have no truck.

It is not surprising that science, or perhaps I should say the layman's notion of science, should have been reflected in philosophy. Positivism, determinism, behaviorism, are natural projections of a mechanistic interpretation of existence. But the scientific method has invaded even fields as unfertile for its seed as history or literature, with the result that history has reverted at times to a kind of richly documented annals and literature has been dissected into a collection of *disjecta membra* without breath of life. And then there is education. But of the role of science there I had better not speak, except to call to your attention a new degree recently established: Bachelor of *Science* in Recreation.

We have become so enthralled with the scientific way that we forget that there is another road to truth—the immediate experience of reality which we call intuition. This intuitive understanding is the only access we have to the deepest and highest aspects of our individual and collective lives. Truth, beauty, loyalty, courage, faith—these are the realities by which men live in the fullest sense; through them we come to the knowledge of good and evil.

Sometimes, so obsessed we are with scientific tests of truth, we question the validity of these intuitive forms of knowledge. But let me remind you that the data of science are objective, quantitative, measurable—the excellence of its theory is clarity; while the data of intuition are subjective, imponderable, immeasurable—the excellence of its experience is vividness, richness, and fruitfulness. Shall I doubt the beauty of a sunset because I cannot define it or communicate it to another? Need I demonstrate the reality of sacrifice to a boy who risks his life for a friend?

It is, then, to the great field of intuitive understanding that we must look to complement and complete our scientific knowledge, if we would live the good life as individuals, if we would aspire to create a good society. And this field is the peculiar field of the humanities, the name we give to the disciplines and experiences of philosophy, the arts, and religion.

The Humanities

Let us look for a moment at certain aspects of content and method common to all the humanities. They are concerned with the creative powers of the individual human mind; their method is the subjective evaluation of a man's own experience or the recorded experience of others; their goal is man's understanding of himself and his place in the physical and social world in which he lives. In a word, they are called the humanities because they deal with the human spirit.

Since the humanities are subjective and personal, each one of us must create his own philosophy, his own interpretation of art, his own religion. This we do by compounding in a single scale of values—metaphysical, moral, aesthetic, or spiritual—all the elements of our own experience and kindred experiences recorded by other men. There is, then, an infinite possibility of different philosophies, expressions and appreciations of art, and religions. But individual scales of value tend to converge toward common standards, partly because our experiences are common, partly because our mental processes have common elements, and above all, because we tend to accept the leadership of the few inspired thinkers, teachers, and prophets, and pattern our scales on theirs.

We should do well to keep in mind the two phases of the humanities as we proceed to the analysis of the individual fields. On the one hand, we are concerned with the study of the creative monuments of other men, past and present—with the understanding and assimilation of their experience. This is a vicarious or, if you prefer, a re-creative experience. When you look at the magic windows of the cathedral of Chartres or listen to the Pastoral Symphony, or read the *Ode on a Grecian Urn,* you are not only stirred to delight by the harmony of color or line or sound or song; you share the creative experience of the artist, the musician, the poet; you participate in his imaginative interpretation of the world he knew. Some part of that interpretation, however small, remains forever yours.

On the other hand, the humanities deal with the individual's immediate evaluation and interpretation of his own experience. This evaluation is reflected in a variety of ways—in a unique philosophy of life, in a new formulation of moral principles, in a work of literature or art, in a mystic revelation. For most of us this interpretation of our experience never reaches the level of communication to others; we may never formulate it clearly even to ourselves. But however humble its scope, however vague its definition, it is this body of evaluations that determines our preferences and our prejudices in the world of thought and feeling. Remembering, then, that the humanities bring together in a single synthesis the vicarious experience of other creative spirits and the immediate creative experience of each individual, let us examine now the special function of the several branches of the humanities.

Philosophy

Philosophy, like science, is a theoretical approach to knowledge. But it differs radically from science in a number of respects. In the first place, its subject matter is ideas, not material things. Its method is speculative, not experimental. Its goal is the explanation of causes and of ends, not of structures and processes. It seeks to answer the question Why?—not the question What? or How?

In the broadest sense philosophy represents an individual's attempt "to grasp this sorry scheme of things entire," to provide a design for man and his universe. Within a narrower range it seeks to create a similar synthesis in such fields as ethics or logic or aesthetics.

In recent times, and particularly in our own country, there has too often been the impression that philosophy is a uniquely rational form of speculation. It is well to remember that many of the greatest philosophies are based on intuitive assumptions, emotional or even hedonistic. So the philosophies of the East; so Plato, so Bergson. Philosophy embraces every effort of the human spirit to give meaning to life.

The philosophic approach to experience is one which is applicable to every branch of intellectual endeavor. The very essence of history, for example, is philosophic; it represents an individual's attempt to interpret the significance of human events and institutions. That is why I have always wanted to include history among the humanities. But most of my historical brethren, stressing the importance of its contribution to our knowledge of social institutions, seem to prefer to include it among the social studies. I should be willing to compromise by saying that history is not a subject but a method, applicable to every branch of learning.

The social studies in general involve a philosophy. Are not history and philosophic theory the chief components of economics or political science or sociology, granted that their descriptive or statistical data may be scientifically assembled? But these data acquire meaning and application only when they are interpreted and evaluated in the light of a theory of philosophic character. Is it not true that the problems of society are an amplification of the problems of the individual? And by the same token every other phase of human experience is susceptible of philosophic inquiry. There is a philosophy of language and a philosophy of art, a philosophy of education, even a philosophy of science. The philosophic position is the basis of every effort to discover a meaningful design and plan in the world of human thought and action.

Thus far I have been concerned with philosophy as a systematic discipline. But the ultimate goal of such an interpretation of experience must be the realization of a design for life by every individual. I confess that the times are not propitious for the attainment of this goal. Our lives are crowded with doing and with talking; there is little room for thinking. The old contemplative mode of life has given way to the diversions of the press, the movies, the radio. Our diet of information is more varied, more abundant. But how much do we digest? What is more, do we find time at all to search our hearts and minds? I have no panacea to suggest to remedy our plight, but of this I am sure: unless we strive to find meaning in our lives, we shall drift aimlessly, buffeted by every shifting wind of adversity from our course to a better world.

THE ARTS

The second great area of the humanities is that of the arts, in which I would include not only literature but every form of expression in which the individual seeks to enhance his interpretation of experience with the harmony and proportion of beauty. The essence of the arts is their emotional interpretation of individual experience; the measure of their excellence is the degree of harmony between content and form; their goal is the creation of beauty.

Each of the arts has its peculiar medium—sound, color, line, movement—and the task of the artist is so to master his medium that it becomes a pliable instrument to express his vision or his dream. Technique is a prerequisite to artistic expression, and its understanding is essential as well for full artistic appreciation; but it is always a means and not an end. Art, therefore, is a skill dedicated to the service of the imagination.

The impulse toward the creation and enjoyment of beauty is innate in the human spirit; it is as clearly apparent in primitive peoples as in modern society. Naturally, with the development of civilization its scope is widened, its significance is deepened; but the fundamental urge remains unchanged. In each generation a chosen few have an inspired message which they must give to their fellow men in marble, paint, or song—in whatever medium is within their reach. And in varying degree each one of us finds in their message an echo of delight within his own heart. Art, whether creative or vicarious, belongs to the whole of mankind; on the wings of fancy, it lifts us out of a world of drab reality into the magic world of dream.

Although art is essentially an individual creation, the artist is none the less a product of his particular generation. He is conditioned by the attitudes, conventions, and standards of his contemporaries. His artistic technique and his form of expression will also reflect the practice of his time. Precisely because of these conditions, the work of art may become a precious document for the understanding of a society, for it adds to the factual data of history the interpretative vision of the seer. In a still larger sense, in proportion as a work of art achieves an interpretation of universal human traits, it becomes a permanent contribution to our understanding of human destiny, perennially new and satisfying.

Music

Of all the arts, music has the most direct appeal to the emotions, because, in its purest forms—quartet or symphony—it is not clouded or confused by verbal associations. Its elements—harmony, melody, voice, choir, rhythm—are not imitations or representations of the natural world; they are symbols of the composer's moods; they evoke, directly, similar moods in the listener. I do not mean that this is all that music conveys. There is a purely sensuous pleasure in sound and movement; for the initiated, there is as well an intellectual satisfaction in the consciousness of structure and form. However, the central significance of music is its power to communicate feeling.

The composer, like other artists, is the product of his age. Hence he reflects not only his own moods but also the moods typical of his time. Do you not feel in Palestrina the austere discipline of the Counter Reformation? Does not Mozart evoke for you the Italianate charm of eighteenth-century Vienna? Is not Prokofiev a reflection of the discord and confusion of today? Music is another measure of the spiritual climate of its time.

In one respect music has a peculiar aspect. Between the composer, who creates, and the listener, who appreciates, lies a performer or group of performers who interpret. This process of re-creation of the composer's idiom gives to music an almost unique function, for it makes possible to individuals and groups an endless opportunity for artistic expression. This explains why music is so universal in every stage of society. The choral and orchestral groups, the community and campfire sings of today continue the tradition of communal song of the past. Perhaps it is the reason, too, why there is a piano in your house.

For most people, music is neither composing nor performing; it is listening. And you will agree that never before has there been an opportunity for so large a number of people to hear music. The phonograph and the radio which modern inventive genius has given us bring music to our living rooms, even to our kitchens, at every hour of the day and night. They bring all kinds of music—the ordered harmony of the past, the jangling rhythms of the present. But in the long run these new instruments for disseminating music cannot fail to result in a refinement of musical appreciation.

Taste in music, as in the other arts, is the product of accumulated experience. Little by little we build a scale of values. This, we say to ourselves consciously or unconsciously, is better than that. Yes, but not so good as that other one. It does not matter if one's scale does not match another's. The only important thing is that each of our scales should authentically reflect our own emotional evaluation; the only mortal sin is aping another's scale out of snobbery or faddism. One is guilty of no crime against taste or decency if he honestly prefers jazz to Tchaikovsky.

Painting

Turning now to the graphic and plastic arts, I shall analyze only one as an illustration of their function in the enlargement and enrichment of human experience. Perhaps I had better take painting, as involving the widest range of sense appeal.

As I look at a painting, what do I see? First of all, it is color, arranged in a pattern. Then it is form—line, surface, contour. Finally, it is design, giving unity to the whole. What is its subject matter? That depends. If it is a work of other days, a Vermeer or a Velázquez, it will be a visual representation of persons and things in the material world. But if it is a modern work, by Picasso, shall I say, it may have no representative value in the conventional sense; it may be only a projection of the painter's imagination. If we look again, we shall see that even when the subject is a person, an interior, or a landscape, it is not the intent of the painter to reproduce the reality before his eyes. By the choice of elements, by their organization in a harmonious whole, he is expressing his emotion in the presence of a visual world; he is giving his interpretation of experience. This is the common purpose of all painting.

And what is the effect on him who sees the painting? As in music, there is a variety of emotions—the immediate, sensuous pleasure of color, shape, or rhythmic line, the more subtle satisfaction in balance and proportion of design, and finally the vivid re-enactment of an experience in understanding. To this I should add the illumination which painting casts on the taste and aspiration of its generation.

There was a time when painting, serving as a handmaiden to religion, was accessible to all who came to worship. But since the Renaissance it has more and more become the privilege or the hobby of an elite. Not even the modern public art museum has brought it back as a vital part of our daily experience. Is there not a lesson in the murals of Rivera, Orozco, or Siqueiros that cover the walls of schools and public buildings in Mexico? Perhaps the art project of the Works Progress Administration of depression days is a step in the right direction, for if painting is to exercise the influence it should have on the individual and socity, it must come back into our daily paths, where all who pass may see and be enriched.

Literature

For the average man the most accessible, the most widely experienced of the arts is literature. By the variety of its types, by the universality of its themes, by the mere availability of its products, it reaches men of every age and every condition. As in every art, its essence is an author's imaginative portrayal of his own image of the world. His instrument is the sounds and associative values of oral utterance. His art is the achievement of harmony of content and form.

It would require another article to explore the special values of each of the literary forms—the novel, the drama, the essay, the lyric. But there are certain considerations common to all which I should like to call to your attention. If we were to ask ourselves where we are to draw the line between literature as an art and as ordinary exposition, I think that we should agree that the man of letters is concerned with creating a form of expression which will most effectively communicate his own emotion, while the expository writer aims only at objective clarity of demonstration. Now it is precisely this central purpose of the author that determines the attitude of the reader or listener: he must be responsive not only to what is said but to how it is said, and this manner of expression will be the key to the emotional and intellectual meaning of the work.

I should like to digress for a moment to comment on a widespread confusion which is current in literary study. Too many of our teachers, too many of our students in schools and colleges, have the mistaken notion that the study of literature is a matter of literary history and the biography of authors and the evolution of literary forms. These are, it is true, elements of importance for the fullest understanding of a literary work. The trouble is that such exercises become an end in themselves. We learn about literature; we never read and experience literature. If poetry is to have any value for us, it must be an intimate, personal experience; it must open magic casements to our spirit. And that can come only by communion with the text itself. For my part, I think that if one has relived, made part of his experience, a single poem or play or novel, he has achieved something far more significant than the person who has learned the dates of all the authors in a literary history.

Before I leave the field of literature, I would point out the extraordinary value of its great masterpieces as a record of the nature of man and the social institutions he has devised. A *Divine Comedy*, a *Don Quixote*, a *Hamlet* are not only a mirror of their age: they are a revelation of man's eternal problems —his frailty and his strength, his passions and his lofty ideals. For you and for me, they are a sure guide to which we may turn to place in perspective our own groping for light.

The artistic crafts

The arts have always had a place in the lives of men, but it is to democracy that we owe the enormous expansions of opportunity for artistic expression and enjoyment among common men. Art is no longer the privilege of the few; it is part of the heritage of every man. And still, the cult of beauty in one phase of life, the artistic crafts, has languished in the last hundred years, largely, I believe, because the objects of daily use have been products of the machine. In other days craftsmen created utensils for humble uses which rivaled in beauty of form the works of professional art. The furniture and the vessels of pewter and glass of our Colonial times bear witness to the artistry of our earlier years. In recent times there have been signs of a return to the older feeling for design, partly in the revival of neglected handicrafts, partly in a new concern among manufacturers for the form as well as the utility of their products. This is as it should be, for beauty is not something esoteric; it is an attribute of every creation of man's mind and hands.

RELIGION

The last of the humanities of which I would speak is religion. My definition of religion is a narrow one. I am not concerned with dogma or sect, or with theology. My interest is limited to religion as a personal experience in which the individual seeks for direct communion with God. If someone says that this is mysticism, I shall assent, since I believe that all religions, especially Christianity, are essentially mystic.

There are two striking tendencies in the religious history of man. One is the emergence of great teachers and prophets who bring a divine revelation as an inspiration for their followers. The other is man's habit of associating himself with other men of common faith for worship and for contemplation. The readiness with which men seek the leadership of a religious master and the support of fellow believers seems to me to indicate their distrust of their own spiritual gifts. Greatly as they need the sustaining grace of a power beyond their own, ardently as they crave to merge their weakness in infinite strength, their desires in infinite love, their finite spirit is bound in earthly chains. Only the saints, like Saint Theresa, have dared to scale the heavenly heights and bring the Lord Christ down. Perhaps, too, men have accepted the revelation of the great teachers because they could find no words to formulate their individual experiences; for the nature of that experience is, in truth, ineffable; it can be conveyed only in imagery or symbol.

I do not need to tell you that religion, like the arts, is an inalienable phase of human existence. An age of pure reason or scientific materialism may seem to throw into question the intuitive understandings of religion. But man must have faith of some sort to live. If his gods are destroyed, he will fashion new idols. Is there a doubt that for the young German of the last decade Nazism was a religion and Hitler its prophet? Religion, like all the other works of the spirit, must be judged by its fruits. In its purest form, it is the noblest of human experiences.

A FOUNDATION FOR VALUES

I have tried in this summary way to suggest the contribution which each of the humanities makes to the life of the individual. Common to them all is the element of experience, creative or vicarious. Common, too, is their power to fashion for each of us scales of values —moral, aesthetic, spiritual—which will serve as a standard of judgment and behavior in the decisions we must make for ourselves and for society. For these values and these standards we cannot look to science. In matters of morals or purpose, science has no word to say. It cannot describe or measure virtue. Only in the realms of philosophy, art, and religion may we hope to find salvation for the human spirit.

The last years have shown how perilous is the possession of technological knowledge without the guiding grace of moral and spiritual principles. No one would question the scientific and technical skill of Nazi Germany, but its skill was dedicated to savage ends; the beast in man was loose with the deadly machines that science had invented, in his hands. We have destroyed that threat, but we have not yet learned how to create a world in which decency reigns. We talk much of freedom and human dignity, but are they more than empty words? To give them content we must renew our faith in the disciplines and the activities which I have just been discussing.

I am not proposing that we go back to a prescientific age. Science is a part of our lives, one of the greatest creative achievements of the human mind. Even though some of its concomitants have been evil or destructive, it has made possible individual and social progress of which we could not have dreamed. How many a fear and superstition it has banished! How much suffering and want it has alleviated! How many comforts and conveniences it has brought within our reach! And not the least of its contributions is the knowledge it has given us of ourselves, the functioning of our bodies, the working of our minds.

The problem of the future is to achieve a synthesis of the two ways to truth, the scientific and the intuitive. As science broadens our knowledge of the objective, material world, the humanities must constantly re-evaluate the human significance of these advances and formulate for the individual and for the community new standards, new ideals. And I would start with the individual, for society is not a mere abstraction, it is a collection of individuals. Socrates was wont to say to his disciples, "Know thyself." That is still sound advice, and the path which leads to that knowledge is the path of the humanities.

An obligation rests upon each one of us to analyze the intellectual problem of his time and to attempt to formulate his statement of its significance, for the impact of modern science affects the individual as well as society. Each one of us must answer to himself what place it will find in the mansions of his spirit.

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Good, Evil, and Beyond

By George N. Shuster

PLATO thought that the gods would never desert a man determined to be just. Where for our time are the gods? And what is justice? These are the same questions our fathers asked, but it is harder to answer them now, for we have found out much more about the world than our ancestors ever dreamed of. It is important to note that the spade work has not been done by the physical sciences only. The careful scholar has, for example, dug into every stratum of historic time and has charted the devious courses of human thought and instinct. Whereas, to use one illustration, no person writing five hundred years ago in any literary language now spoken had so much as dreamed of the Americas, though these had brought to flower at least three rich cultures, any one of us who cares to do so may learn in detail the customs by which Tierra del Fuegians lived three thousand years ago.

Even the average semiliterate human being has acquired, without appreciable effort, a beguiling awareness of the world as a whole. He is led to speak, cheerfully or in resignation, of "one world," and to feel that the earth has obviously grown smaller. If he is naïve, he will suppose that this sensation results from being able to move from place to place very rapidly, by car, airplane, or rocket. Or he may be more learned and surmise, possibly in the manner outlined by Richard Hertz in a rather notable new book,[1] that because no new economic areas can be found for exploitation or development, aggressive capitalism throughout the world has faded into history, taking with it uninhibited individualism. Or finally he may proceed, as a political philosopher, to declare that unless rules of social action are imposed uniformly on all peoples by all peoples, world-wide conflicts will lead to world-wide ruin. Had wars been limited, say, to conflicts between Germany and France, the atomic bomb would never have been invented. One government, we are therefore told, must speedily be devised for one world.

On the other hand, people are curiously aware that the intelligible universe has somehow grown more minutely divisible than it used to be. Manifestly the physicist has imprinted the idea of the microcosm indelibly on the mind of every citizen of this age. Or one may read of extraordinarily fruitful inquiry into the structure of organic matter, such as that recently described by Professor van Niel, and rise certain that the architect of living things is an infinitesimal fellow, indeed. But I am not thinking of smallness primarily in the scientific sense. That learning must be concerned with a vast number of little things, the dimensions of any of which we are never wholly able to determine, is a fact which at one level produces specialization, from which, alas, no efforts at synthesis will seemingly ever emancipate us. While our efforts to make one world in the intellectual sense may spur us on to select and study a hundred best books, it is clear that none of these books will mean a great deal unless there is added, by way of appendix, what generations of writers in the same field have subsequently reported. Reading Euclid is, in short, of relatively little use unless one also reads Planck.

Twin Millstones

And in another area, modern man has

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[1] Richard Hertz, *Man on a Rock* (Chapel Hill, N. C.: University of North Carolina Press, 1946).

an uneasy feeling that any value to which he might wish to commit himself has been challenged sometime, somewhere, with arguments of such great complexity and wit that it would be futile to attempt to dispose of them. Therefore he is skeptical of all values, even those applauded by the club to which he belongs, unless they are attacked by someone he dislikes. At any rate, our perception of the ever increasing smallness of intelligible reality leads to a cynical resignation which differs from the despair of the ancient world in the significant sense that whereas that despair was rooted in a conviction that nothing could be proved true by dialectic, our resignation is born of the feeling that there is so much to know about everything that knowledge of anything specific is made impossible.

Here are the twin millstones of modern culture, and they can grind exceeding well. On the one hand we are urged to comprehend and endorse "one world"; and on the other hand we are certain that we can comprehend and endorse literally nothing. That is the central experience of our time. We know that the various energies recently released by science and already harnessed by technology are potentially more revolutionary than were coal and iron in their day. But you have only to talk with labor people a short while to realize that the common man, far from being exhilarated by the prospect, is terrified instead. He does not discern any correlation between what is being planned by the chemist and the engineer for mankind as a whole and what he, as a single little human being, dreams of for himself. That labor should now actually be engaged in organized warfare against technology is startling, in view of traditional American optimism. It means that the worker no longer believes that the inventive human mind can be trusted with human values.

PHILOSOPHIES OF NIETZSCHE AND MARX

Knowledge that he was caught between the millstones of the potential wealth of knowledge and the limitations of man was, for instance, what goaded on that great recorder of elemental poetic intuitions, Friedrich Nietzsche. I believe we may say that Nietzsche, an exceptionally religious man, abandoned the idea of God because he did not see how the multifarious facets of the reality made manifest in intellectual experience could be integrated. And of course the first truth about the apprehension of God is that He is integration. Being, however, a sincere and creative individualist, Nietzsche also realized that without a source of creative unity, man could have no civilization. To solve the problem, he invented the hypothesis of emerging omniscient mind. But the farther away from Nietzsche we get, the clearer it becomes that this hypothesis is untenable. It is not bettered by tinting it with fictitious Darwinism and saying that 25,000 years of waiting will improve the human brain. We see only too clearly that those who propound this belief themselves deteriorate noticeably with each ten years.

Conversely, it seems to me that Karl Marx and his associates abandoned the idea of God primarily because they thought that the integration of nature and spirit, of man's vital functions and the laws of cosmic energy, was so definitive a fact that no room could be found for the individual person. And obviously the second characteristic of the idea of God is that He must be a person. But today it is quite clear that the human individual, at least, is a necessity. For he is, among other things, the leader who alone can make communism work. And more generally, the contention that economic and biological development are so closely intertwined that they secrete the thoroughly conditioned human atom, without personality or the need for it, must surely be abandoned, for if there is anything modern history has demonstrated, it is that freedom is not a formula but a desire.

PHILOSOPHY OF THE TOTALITARIAN

These two philosophies were inevitable products of the twin millstones; they were nobler in conception than the doctrines which were their time-born rivals, and I have no illusions about lightly disposing of them. Nevertheless, it is clear that they were attempts to substitute for the relativism of their period a fabricated absolute. If either the Marxist or the Nietzschean point of view was a satisfactory doctrine for living, why should not a blend of the two be an acceptable synthesis? Such a synthesis—and it is a formidable one—has been put forward by the totalitarians. To the Nazi, for instance, the world is nature and yet also superman. The Nazi is a socialist and yet also a thoroughly uninhibited individualist. The Stalinist differs only in color.

But now the ingredients in this mixture of philosophies suffered a tremendous change. Notable energies of a sort were released by opening the sluices in the dam. The Nazi rid himself of the social pity which is conserved in the writings of Marx, and transformed Nietzsche's superman into a ruthless and tyrannical boss. The totalitarian synthesis took away from the people their endowment of personal dignity and autonomy without offering in exchange a natural order which functioned to their advantage. A human being might well surrender some treasure of liberty for the sake of security without finding the bargain unfair. Some might even argue that all freedom could be exchanged for security, but to be robbed of liberty and still be left wholly insecure is an outrage.

I want to stress the terms freedom, security, and outrage, for if they are understood, Nazism can also be in part comprehended. As late as a century ago, each of these words had two connotations for most people in the Western world. Freedom was the acquisition of a kind of social permit to act on one's own initiative, at the voting booth, let us say. But freedom also meant ability to make a personal decision about conduct and was, in short, a precious right to follow the dictates of one's own conscience. Security was a defense against need, a right to some property, but it was also a state of inner equipoise resulting from the conviction that one had chosen the Good. And as for outrage, it was on the one hand an action against which the law could be invoked, and on the other hand an event which stirred the conscience to vehement and vital protest.

The totalitarian disorder is a state of mind in which the second parts of these definitions have vanished completely. The Nazi, for instance, defines liberty solely as power, security only as protection against material want, and outrage merely as misfortune through which something one has craved has been given to someone else. A master race—or, let us not forget, a self-righteous nation—is thought to have freedom only when it holds dominion over others. Security is *Lebensraum,* or an area of vassal states. Outrage is maldistribution of raw materials, prestige, or wages. In short, one-half of the domain of experience to which the three most basic human words apply no longer exists. If you have ever talked frankly with a young totalitarian, you know what it means to carry to the radical end result this restriction of reality. For him the extermination camp was not a crime but merely an efficient instrument devised by an astute collectivity for the purpose of establishing power and security. Having been trained to throw off every vestige of a commitment to older ethical views, he has become, wholly without knowing it, an emissary of hell upon the earth; for there is nothing very important to say about hell save that it is beyond good and evil.

The young totalitarian has become the sternest object lesson which modern man could have set before himself. He is far more terrible and significant than the atomic bomb. This bomb can kill—kill, perhaps, all that lives upon the earth. But the young totalitarian is not only the person who might use this bomb; he is also the representative of a mankind which, for its own good, ought not to live. Well, you may say, let us punish him, eradicate him, reduce him to fertilizer in his own Belsen ovens. But before we agree, let us ask two questions.

THE PROBLEM OF JUSTICE

First, is not our society populated by millions who share the views of the young totalitarian? "Shall we say there is no such thing as truth and error, but that anything is truth to a man which he troweth?" Newman asked many years ago. Undoubtedly, on the score of ethics, a vast number of people would reply in the affirmative, claiming the right to possess tomorrow a truth wholly different from that of which they boast today, if a change be profitable to themselves.

Second, on what ground shall we denounce the young totalitarian? As modern men we have said that our knowledge of psychology is so extensive that there is no way of attributing to any individual responsibility for his actions. With the benevolent Mr. Justice Holmes we have declared that the assumption of a persistent, functioning, spiritual nature in man, regally entitled to live not by nature's laws, but by the rights rooted in the order of its being, is untenable obfuscation; and that all so-called rights have merely been staked out by social agreement so as to make the business of survival possible. Arthur Koestler has recently quoted Professor J. W. Bernal to the effect that because "collective action is the only effective action, it is the only virtuous action"; and has gone on to note correctly that on the basis of such a philosophy the young totalitarian must be a virtuous person, since all he has done is to subordinate his individual rectitude to the purposes of the effective collectivity.

In short, our millstones seem now to have brought us to the point where simple justice and simple logic compel us to say to the *Schutzstaffel* trooper on trial that since "one world" is the sole absolute because it is the ultimate collectivity, and since man knows so much about everything that he can know nothing, then the only reason why he, the trooper, is being tried is because in the struggle for ultimate mastery of the "one world" he lost. And to one's horror—though it may well be horror only for those who conserve a nostalgic reverence for the ancient ethical traditions of mankind—one must observe that this is just what is being said. Mr. Justice Jackson's corpus of ex post facto law would not be objectionable if it were limited to emphasis on universally evident principles which by mere chance had not been written into statute. Thus there would be honor in trying men reputed to be responsible for the torture inflicted at Buchenwald, even if humanity had never previously reckoned with such camps and so had failed to legislate against what was done in them. But Mr. Justice Jackson's law is not limited—it is rather whatever one wishes to put into the code. It has decreed, for example, that aggression against Poland was a crime against international justice, for which the guilty must be punished. But if aggression against Poland was criminal, then Russia, too, was guilty. And how can the guilty sit in judgment without making of the trial a notorious farce?

CONFLICT OF WORDS AND ACTIONS

Let us probe more deeply into ourselves and hide nothing. During thousands of years of recorded history, the noblest among men struggled to conserve justice. They husbanded what they had of it with greater care than they expended on their flocks or their clothing or their food. One cannot read the Mosaic books or Plato's *Laws* or Aristotle's *Ethics* or the Epistles of St. Paul or the sermons of Savonarola or the writings of Thomas More without becoming deeply aware that for these authors justice was a more fearful and dangerous, a more potentially useful and beneficent thing than atomic energy is for us. They saw that if any large number of men began seriously to sanction injustice, the common bonds of humanity would be riven asunder.

And we? Must not any observer say of us that although we train multitudes of men and women to use social, political, and scientific energy hitherto unknown, we give only a handful of them any lessons whatsoever in justice? Indeed, do we not cheerfully admit that we do not know what justice is? When we dropped conflagrations on the women and children of Nagasaki and Hiroshima, were our leaders pacing the floor in the night wondering whether such a gruesome massacre could be justified? Did we tell our armies of occupation, when they went out to do what might have been their sacred duty, that they were to put on the armor of justice? The stern truth is that their leaders did not know what the armor of justice might be.

And because these things are so, the words we have spoken in reply to the totalitarians have no fire in them. Why should we have imagined that we could blot out the influence of the evil genius of Goebbels—for he was both evil and a genius—with clichés, the meaning of which we ourselves had not explored? Nothing ever said to nurse the sorrow of bruised and bleeding humanity back to health was more like balm than was the language of the Atlantic Charter. It was the blueprint of a liberating social vision by which men might have steered a course onward. But who, if perchance he even recalls that such words were spoken (it is part of the tawdriness of our estate that apparently they were never written), does not bear heavily his unconfessed guilt for not having insisted that they must not be forgotten? Now we say nothing any more because we have nothing to say. We have had an incomparable, a liberating, victory, but we remember it only in phrases so tawdry, stilted, and unctuous that it would be better for us if we were silent.

Indeed, if one looks realistically at this victory in its present outline, expecting no more than the Stoic, for instance, might in his day have expected of a comparable triumph, one finds it difficult to think of any image save that of a pit into which a crumbling civilization is falling deeper, hour by hour. In his day Fénelon, aghast at battles which were merely battles and at victories which were only victories, wrote, at some peril, to his master, the King of France: "We are in real need of only one thing. That one thing is called justice! The fact that you must protect the boundaries of the realm is by no manner of means a reason why you should take from the neighbor of France his terrain." And I do not believe that any of us can legitimately surmise that the great bishop, whose concern for righteousness was no more academic or merely theological than was that of Socrates, would have spoken any differently to the masters of our time.

This, then, is where we stand in our debate with the young totalitarian. He is the beaten inheritor of an era; we are still that era's victims. Or rather, we stand like policemen at a crowded corner in the world's history, ourselves rendered powerless in the traffic snarl. Somehow we must make up our minds to get out of it. We must find a call, an order, a drift, a motive. But where, you will ask, shall we discover any of these? The American scholar would be false to his tradition if he asserted that this is an easy question. He has lived so long at his job of digging after truth that the discovery of a world round about him in which ethical truth no longer exists is a startling one, indeed. It is clear to him that without such a truth there is no defense against totalitarianism. But where is he to find it?

SCIENTIST AND SAINT

I shall say some things first of all concerning the scientist. He is the inner motor impulse of our time, but not its maker. The function of his method in the realm of ethical thinking has been to correct the bad guesses and facile generalizations of moral theoreticians about the nature of the physical universe. But that the scientist himself should contribute constructively to ethical theory, to the discussion of the nature and the ultimate destiny of man, is another question. It may well be that his comments on these subjects will merely arouse irony comparable to that which the moralist evoked when he indulged in fantasies on scientific topics.

Again, it is no longer certain that the people would follow science if it attempted to lead them. The average man has never wanted to be a scientist. What he has craved is the pleasant fruits of scientific labor; and he does not even yet realize that it is he himself who turns these good things into fearful weapons of disaster. Before Nagasaki, the great men of the laboratory were held to be humanity's servants. Today that is no longer so.

Finally, the scientist has not been taken at his true worth. Nothing could be more striking than is the resemblance between the faces of devoted chemists and biologists and the countenances of zealous practitioners of the spiritual life. In both one reads the acceptance of renunciation which is the first principle of the vitality of mind. When Francis of Assisi came down from Monte Alverne to die, there were in his hands and his feet the stigmata, or signs, of liberating spiritual suffering. And partly because of him, I reverence an illustrious scientific worker I know in whose flesh mysterious rays have left their ominous imprint—a secular stigma—or is it secular?

The scientist and St. Francis! I propose that duality to education as a point of departure for getting out of the abyss. Why should we always think of what the scientist does and never of what he is? The inventions of technology are only gadgets, just as the concept of the United Nations is a gadget of political scientists. But that a scholar should, by reason of delving sacrificially into the secrets of nature, come to live by a purifying and ennobling law—that the great scientist is, in short, a kind of saint—happens to be a wonderful truth. It proves that something can really be done to rid man of his dross. I have known, as have you, eminent workers who by dint of contemplating the fateful definiteness of the natural law became even as little children despite the vastness of the vistas which their intellects had conjured up. They may never have spoken the name of God, but the splendor of His handiwork was reflected in the humility of their eyes.

Theirs is not spurious mysticism, like that of the Nazi or the Communist, but comes right out of the heart of Reality. It is the most impressive result of being a scientist, though it does not follow from the use of scientific method. And why should we not believe that it is quite as possible to transform man through contemplation of the moral law —of the order by which the human spirit moves to its fruition, and from which it can deviate only with disaster? It is true that this order is even more difficult to discern than is the rule which governs the stars. The saint, who for the sake of reading it aright has hovered over the crater in the surface of the human soul, may see through a glass darkly; but he sees. And in seeing, he too garners into his own personal vision a goodness which is a reflection of everlasting Goodness.

ASSENT TO HOLINESS

Thus the scientist and the saint meet at a point of light. The difference between them is, however, great. The saint is he who has made the fundamental assent, namely, that to holiness, which is the immolation of self for the sake of integration with the Whole. He is not a variety of religious experience, but a continuous, living, spiritual experiment. Holiness is, whether one relishes it or not, a fact. It is, I grant, terrifying and uncomfortable. So also is the burden of integrity, or of persecution suffered for justice' sake. The people have always been fearful of the saint. They are afraid he will take their toys away. But they ask nevertheless for the sacrifice, the heroism, the unworldliness of saints, so that life as a whole may preserve an inner core of decency.

There is no ethic which can resist the solvents of totalitarianism save one that is rooted in holiness. No one has ever known that better than the Nazis knew it. Justice can no more thrive without the saint than our knowledge of the physical universe can thrive without the scientist. He is the one who knows that justice cannot derive from an armistice between omnipresent protagonists in the struggle for existence. It must either come out of the character of the Universe or be the arbitrary product of the human will. Lord Acton's phrase, "All power corrupts, and absolute power corrupts absolutely," was never more true than it is here; for if man has the power to create an ethic after his own liking, that power is absolute and will corrupt absolutely. It always has done so.

I should like to add just two things. To ask the saint and the scientist to give an account of themselves is not to suggest that either will immediately be believed. For those of us to whom the ancient Jewish and Christian faith brings not defeat but joy, not doubt but confidence, it may be difficult to understand why the urge to holiness which glows so warm in our tradition should be invisible to so many. The Christian is aware that the Beatitudes, eight in number like a round of dancers, are fruits that swing too high in the tree for him to pluck. None the less, it seems to him that nothing more glorious was ever said of man than that some day his reach might attain even unto them—that he might be rich because he was poor and mighty because he was humbly selfless. But he must be patient. He cannot help knowing that a curtain has fallen between him and the rest of men. He must give them an example before he can furnish them with a doctrine.

EDUCATION IN A DECADENT CULTURE

Again, there is no point in being led into a debate about whether ours is a sensate culture. Of course there are ominous signs of degeneration. Paul

Bourget wrote of the French eighteenth century:

> Men and women moved about amid intellectualized fantasies, without any irkling of daily and dolorous reality. Where could they have learned that the world was tormented by the struggle for daily bread when they came and went in the midst of unbridled luxury and exorbitant privilege, themselves light-o'-loves and fondlers of abstractions?

And one need scarcely wonder that we should be fashioning our own plaster casts of the ancient regime. Ours, too, is a small but gaudily tinted society of women who desire to be not sweet but acrid, and who with their shifting men drape their lusts behind a screen of kaleidoscopic legality; of the male hard of heart, aloof from all interests save those of money and the ironic emptiness of the passions it will sate; and of an omnipresent bordel of the mind, wherein a pantomime of the breasts of courtesans blots out not merely the remembrance of mortality but the torch of life itself. But I think that if we can once more find out which end of the universe is up and which down, these things will matter little.

It will, perhaps, suffice for our time if there can be found room inside our education for so much of the teaching of justice and charity as will enable our children to build dikes against the flooding of the spirit of man. If we can put together for them what the scientist knows about the meaning of life and what the mystic and the saint know—it is very little and yet infinitely difficult to come by, even so—they may be strong and comforted in their awareness that the true unity that underlies human experience is not cosmic fact but universal mystery, though it is a mystery that has a stern orderliness which the mind can conceive, as well as a seemingly wayward, but nevertheless also carefully patterned, goodness which we can call Love. They will not have Truth, but they will know with the great Greek that "Truth for all time abideth."

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Book Department

BRODIE, BERNARD (Ed.). *The Absolute Weapon.* Pp. 214. New York: Harcourt, Brace and Co., 1946. $2.00.

In this book five members of the Yale Institute of International Studies investigate the problems of atomic war, its conduct and prevention. Although the authors eschew the doomsday rhetoric which the general public has learned to expect from experts on atom politics, they succeed in presenting the most impressive analysis of the terrible dilemma which thus far has appeared in print. They are agreed that the political problem of the atom bomb, superimposed on the staggering problems of pre-atomic world politics, cannot be isolated from the syndrome of international crisis; that control of atomic energy as a weapon is tantamount to the imposition of political, not merely technical, controls; that the United Nations offers the most practical alternatives now available for averting "a clear-cut polarization of power around . . . the Soviet Union and the United States," the tendency toward which is fraught with the most immediate threat of war, atomic or old-fashioned; and that the best defense of the United States against the threat of atomic attack, although not against terrible destruction once that attack has been launched, is determent-power, i.e., capacity for instant retaliation.

Paradoxically, *The Absolute Weapon* is a valuable contribution to the controversy on Man and the Atom just because it rejects absoluteness as a basis of discussion. Since the authors are apparently agreed that capacity for retaliation is the factor most likely to deter a would-be aggressor, they contend implicitly, it seems, that the effectiveness of atomic weapons is relative, i.e., relative to other atomic weapons. This impression is strengthened by Dr. Brodie's two chapters on the strictly military implications of atomic energy. The first is a synopsis of the views expressed by various physicists. Dr. Brodie, leaning heavily on the Smyth report, argues that military and naval supremacy in the traditionally accepted sense no longer furnishes protection against attack by atomic missiles. He agrees with those scientists who assert that there is no "secret" and that other nations will be able, in a few years, to break our monopoly of atomic weapons. Having put this by-now well-traveled ground behind him, Dr. Brodie proceeds to speculate brilliantly on the technical aspects of large-scale atomic warfare. He proposes for the United States a military establishment which will be independent of urban centers of supply. The armed forces are to consist of three categories: the first capable of retaliatory attack with atomic bombs; the second capable of invading enemy territory; and the third capable of repelling invasion and bringing relief to devastated areas. Dr. Brodie, like every serious military expert in this country, envisages the mission of military and foreign policy as being that of averting, rather than winning, wars. But unlike the proponents of international control as the one and only alternative to inevitable destruction, Dr. Brodie has the intellectual courage to investigate the case that failure of international control schemes compels us to devise a unilateral policy of national security.

Dr. Wolfers, in his chapter on the atomic bomb in Soviet-American relations, insists upon the fact, amply borne out by recent events, that it is pre-atomic tensions—not our possession of the atomic bomb and Soviet "suspicion"—that have caused the deterioration of Soviet-American relations. Dr. Wolfers, perhaps the most lucid thinker on European politics in this country, calls for "wise statesmanship [seeking] a mode of conduct which will neither tempt the Soviet Government to overstep the limits we can in safety and decency concede nor provoke it to undertake actions out of sheer resentment or suspicion of our intentions." Dr. Wolfers, putting first things first, considers agitation for the abolition of the veto right in the U.N. a singularly inept approach toward a general Soviet-American settlement.

Dr. Corbett, taking up this theme, examines the impact of the atomic bomb on collective security and national sovereignty.

Dr. Corbett sees little hope that "the great-power veto [in the U.N.] will be given up in any near future, even for the limited purpose of controlling atomic armaments." No doubt control machinery can be designed and the United Nations Charter can be broadened to accommodate a control system no less effective than, let us say, the Security Council. But, Dr. Corbett warns, "the more essential condition of peace in an atom-splitting age, as before, is underlying acceptance of common values"!

In the last chapter Dr. Fox presents a concise and realistic appraisal of the technical and political aspects of control. He asserts that "the Board of Consultants' [Lilienthal] report has suggested a line of action which is both feasible and bold." He hastens to add that "top priority must be given to the transitional problem of keeping the future open until men can make the fundamental adaptation necessary to civilized life in an atomic era. It cannot be too strongly reiterated that 'permanent' solutions which risk atomic war now in order to have permanent peace later are no solutions."

The Absolute Weapon is an important book because the authors combine thorough understanding of technical problems with a strong sense of what is and is not feasible politically. While principally concerned with the latest threat to our battered civilization, Dr. Brodie and his scholarly companions have contrived to expand a book on an atrocious gadget into an extremely interesting introduction to world politics.

ROBERT STRAUSZ-HUPÉ

University of Pennsylvania

FINER, HERMAN. *The United Nations Economic and Social Council.* Pp. 121. Boston: World Peace Foundation, 1946. Cloth 50 cents; paper 25 cents.

This small book will be of interest especially to students of the United Nations and of international administration. The competence of the author is demonstrated by the way in which he handles the experience of the ILO and of the League of Nations bodies dealing with social and economic problems. His grasp of the functions of the new international agencies, such as the International Monetary Fund and the Food and Agriculture Organization, is equally sure.

The author explains the possibilities and the responsibilities of the Social and Economic Council as a co-ordinating body for all of these services and discusses the overall role of the Assembly in this regard. Though they are without any powers to command, he foresees a widening role for these relatively nonpolitical agencies. He does not believe true world government to be possible within any predictable time.

The treatise is an excellent introduction to a subject of developing importance. Those who are depressed by the tendency of the Security Council to act as an extension of great-power foreign offices should find some comfort in the constructive possibilities of the relatively nonpolitical organs of the United Nations.

D. F. FLEMING

Vanderbilt University

RIDER, FREMONT. *The Great Dilemma of World Organization.* Pp. 85. New York: Reynal and Hitchcock, 1946. $1.50.

The great dilemma which the author presents is stated in the question (p. 5): What measuring stick for voting power in the United Nations can be found other than population? The little book is thus another study of graded representation in international organization. The author does not seem aware of some of the studies which have been made in this field, but his purpose is to present his own plan, which is a different and interesting one. It is supported by statistical calculations which must have meant much labor.

A sound basis, the author says, must be one which is fundamentally equitable, mutually protective, and adaptable to changing conditions (p. 30); and it must give more representation proportionately to the more civilized states. Such a basis is ability to exercise the responsibilities of membership; and he proposes to measure this by "the relative sum total of the educational accomplishment of all the citizens of each country." More definitely, this means the total of the years of individual educational accomplishment on the part of each of the citizens of the state. Mr.

Rider is thinking in terms of a world state, each nation being divided into electoral districts, and each district free to nominate and elect its own representative to the World Assembly in its own way.

This method, according to the author's calculations, would give to the United States 88 representatives; to the U.S.S.R. 59; to Great Britain 49; to Germany 44; to France 22; to China 20; and so on down the scale, with thirty-nine states having only one representative each. It is to be doubted whether such a sole measuring stick would be acceptable; but the plan gives concrete form to the suggestion often heard that education should be one of the criteria to be employed. It is a useful and compact contribution to the study of the problem of graded representation.

Clyde Eagleton

New York University

Northrop, F. S. C. *The Meeting of East and West.* Pp. xxii, 531. New York: The Macmillan Co., 1946. $6.00.

Professor Northrop's aim is to face and resolve "the ideological conflicts of our time." He assumes that the achievement of this aim will resolve, also, all of our other conflicts. He takes as "the major event of our time—the meeting of East and West. Within the all-embracing and deep-going issues raised by this momentous occurrence the other ideological conflicts of our world are partial components." Hence, the ideological reconciliation of East and West will entail the solution of every other problem.

In pursuit of his aim, Professor Northrop examines certain elements in the cultures of Mexico, the United States, England, Germany, Russia, Western civilization more generally, and the Orient (which last he finds to be a single culture). He states a philosophy of science, of art, of religion, and of history, all four of which are applications of a metaphysics which he calls "the philosophy of the theoretic and aesthetic components of the nature of all things."

Professor Northrop believes that his inquiry has succeeded, and that his theory makes possible: "(1) the relating of the East and the West; (2) the similar merging of the Latin and Anglo-Saxon cultures; (3) the mutual reinforcement of democratic and communistic values; and (4) the reconciliation of the true and valuable portions of the Western medieval and modern worlds"; as well as "harmonizing the sciences and the humanities," explaining the nature of the self, providing for freedom and social reform, and establishing the "philosophical foundation for world sovereignty."

With such an aim and estimate, Professor Northrop will not, I imagine, be surprised that his book brings less than full conviction to many of his readers. The doubts of some of them will be increased as they discover that he defines the total character of a culture in terms of rather arbitrarily selected "ideologies," not only largely divorced from their historical contexts, but presented in versions of active apologists for the given culture. He considers the meaning and the ideals of communism, for example, to be what official Communists say that they are. Moreover, in spite of minor verbal qualifications, he accepts as the determinative causes of historical structure and change, prior to all material, psychological, economic, or political factors, the basic metaphysical concepts which he reaches by intricate logical analysis. Only such a theory of historical causation, indeed, would entitle Professor Northrop to believe that his inquiry has advanced his commendable practical objectives of world understanding and humane world organization.

Fortunately, it is not necessary to agree with Professor Northrop's overriding theses in order to be frequently enlightened by his book. His discussions of Locke's ideas and their consequences, of the refreshing combinations in Mexican culture, and of the intuitions revealed in Far Eastern art and religion are particularly rewarding.

James Burnham

New York University

Christensen, A. N., and E. M. Kirkpatrick (Eds.). *Running the Country; An Anthology of American Politics in Action.* Pp. x, 1001. New York: Henry Holt and Co., 1946. $3.95.

This review is being written a few days

before the November elections. It is evening, and through the open window float the impassioned words of a political speech being delivered on the street corner below. It is peculiarly necessary, in a democracy, that the man in the street not only know about the candidates for whom he votes but that he also understand the mechanism by which his government is operated. For that reason any publication which promotes a better understanding of government is worthy of careful attention. And for the same reason the author of any publication in this area is presented with the responsibility for exercising great care and objectivity.

The present work first appeared in 1941, under the title of *The People, Politics, and the Politician.* In the preface to the present edition the editors announce their objective in most laudable terms:

> The United Nations won a military victory. But that victory assured neither lasting peace, nor establishment of democracy abroad, nor its preservation at home. . . .
>
> The men and women who are to carry on the struggle need knowledge and understanding of the conditions under which they work. . . . They need knowledge and understanding of governmental institutions and of how and for whom these institutions work; they need to make full use of their critical powers to solve man's day-to-day problems. With this in mind the present volume has been prepared.

The editors have chosen 120 selections from books and both professional and popular magazines. They have grouped these in thirty-four divisions. Each of these divisions is prefaced by a brief editorial introduction, and the bibliographical data are indicated for each selection. In addition there is a brief biographical note, of from three to eleven lines, for each contributor. The editorial introductions are, in general, very well done, and aid the reader in following any particular interest that he may have. The list of contributors is impressive, and contains many of the best thinkers of the last half-century. Few people today will read a thousand-page volume for pleasure or relaxation—at least in the nonfiction field—but this is an excellent volume to have at hand for occasional reading.

The present reviewer has two criticisms. A few of the selections do not represent the most commonly accepted thinking in important areas. For example, J. Allen Smith was important in developing the economic interpretation of our history. He unquestionably had great mental powers; Parrington, La Follette, William Allen White, and Charles A. Beard were influenced by his writings. Yet to cite him as an impartial authority on the government of the Revolutionary period is as bad as to present only J. Mark Jacobson's views on the Articles of Confederation. The present volume does both. Moreover, while Upton Close's discussion of the need for jury reform, and of the report of the Ruth Commission, is innocent of any particular bias, this reviewer wonders if the editors could not have found adequate opinion on this point without including the writings of one of the most reactionary and undemocratic thinkers of our time. In general, however, the editors have realized their objective of increasing the readers' knowledge and understanding of governmental functions.

RALPH ADAMS BROWN

New York City

ANDERSON, WILLIAM. *The National Government of the United States.* Pp. x, 593. New York: Henry Holt & Co., 1946. $3.40.

If anyone thinks that our National Government has been revolutionized or even pulled out of shape by the war, he can take cheer from this book. Its very up-to-dateness emphasizes the lesson it teaches, that wartime changes have been incidental, and that the basic patterns of the Federal Government remain. The return of "normalcy" since the book was written will merely require the reader to pass over some of the temporary institutions which were already disappearing when the author wrote.

Although a textbook, and printed with the usual headings and subheadings, the book has a readableness and a sureness of touch which make it interesting to anyone who wants to be up to date about the United States Government. Furthermore, the author has not been afraid to comment judiciously and briefly where comment is illuminating.

It might be said that in some ways this book is peculiarly American It represents a liberal and progressive point of view more in adopting and approving changes that have been made and that have worked than in stating a theory of government and testing institutions by that theory. The book also represents the conservatism of the United States, which attempts to assimilate all changes to established institutions and practices, so that they appear to be no changes at all, but merely an elaboration of ideas already well known and well accepted. No doubt much of the book's excellence comes from the fact that its author, for many years professor of political science at the University of Minnesota, has had the great advantage, during recent years, of being a constant observer of activities in Washington while continuing his teaching and his direction of research activities in the Middle West.

Two of the fields which Anderson discusses most interestingly are those of the war powers of the President and the control of foreign relations. Anderson gives the impression of being like so many Americans who would perhaps prefer that the United States were not a world power but recognize that it now is such. Anderson accepts the element of dictatorship which (he thinks) must be inherent in the conduct of foreign affairs, though he insists on democracy at home.

Clear and calm in presentation, and comprehensive in substance, this book is very nearly a model survey of the Government of the United States in the period after the war and before the peace.

EUGENE P. CHASE

Lafayette College

SWISHER, CARL BRENT. *The Growth of Constitutional Power in the United States.* Pp. x, 261. Chicago: University of Chicago Press, 1946. $2.50.

Professor Swisher in this contribution to American constitutional history has appropriately emphasized governmental power from the standpoint both of its expansion and of the contraction of the limits to the exercise of power through a species of judicial abdication. In tracing the growth of constitutional power, Professor Swisher has astutely arranged his materials so as to present the conflicting doctrines of nationalism and states' rights, liberty and authority, and such other dichotomies as combine to make American constitutional law a compound of contradictory principles. In so doing he does not hesitate to give his own interpretations of constitutional development or to state his values in terms of popular government, political and civil liberty, and the protection of the individual against the concentrated economic and political power of a corporate collectivism.

Although Professor Swisher envisages the danger of tyranny in unrestrained power, he does not generally disapprove of the expansion of governmental power under the New Deal. He takes exception rather to the loose and chaotic administration of the domestic measures of the Franklin Roosevelt administration and the mounting trend toward executive irresponsibility in foreign relations. He effectively exposes the motives of latter-day advocates of states' rights who would dislike effective state controls as much as they do Federal controls, and also points to the contradictions inherent in political democracy and economic autocracy.

In assessing developments since 1937, Mr. Swisher regards present-day constitutional interpretation as a blending of Marshall's principle of national supremacy with a shift to positive action, Taney's emphasis on state power, and judicial toleration of both state and national power. The net result he regards as more in line with constitutional tradition than that which obtained from 1886 to 1937, when the judicial veto was used to write laissez faire into the Constitution. The constitutional changes which have taken place represent the attempt of the Supreme Court to "reconsolidate constitutional interpretation along lines which are tenable of current conceptions of the public welfare" (p. 229). The task of the Supreme Court today is, therefore, "that of re-establishing lines of continuity with the more distant past in order to guide current constitutional development in terms of the essential principles and ideals of our constitutional system" (p. 228).

Mr. Swisher's latest study is one of the more valuable contributions to the literature of American government and public law, and should appeal equally to interested students of politics and to specialists in those subjects. Aside from an irritating misprint on page 21 where the reference should be to Edmund and not John Randolph, and the inferior paper now in general use, the volume is singulerly free of the defects characteristic of war and postwar printing.

ROBERT J. HARRIS
Louisiana State University

CHAMBERLAIN, LAWRENCE H. *The President, Congress and Legislation.* Pp. 478. New York: Columbia University Press, 1946. $5.00.

Leadership in the legislative process is provocative of much discussion, especially when approached as a critical problem of government. By no means a new topic, it has received a fresh treatment at the hands of the author of the volume under review. Professor Chamberlain has pondered the problem thoughtfully, has written interestingly, and has reached suggestive conclusions.

Believing that a more accurate picture of the legislative process would result from the examination of a cross section of Federal legislation, the author has studied approximately ninety major enactments of the past half-century with a view of determining their origins in terms of legislative-executive relationships. These selected statutes fall into ten categories: agriculture, banking and currency, business, government credit, immigration, labor, national defense, natural resources, railroads, and tariffs. There will be scant dissent as to the choice of the measures for analysis in terms of their significance and importance.

Each of these ten categories of significant Federal legislation has received a careful, historical treatment involving a detailed scrutiny of all proceedings of both branches of Congress and the examination of other pertinent source materials. The legislative gestation of each of the ninety chosen laws is carefully charted from conception to enactment. The responsibility of President and Congress for the ultimate birth of each measure is assessed and appraised. Numerically it is found that the influence of the President was preponderant in nineteen instances; that of Congress in thirty-five. In the case of twenty-nine of the statutes studied, the verdict is that of joint responsibility on the part of the Congress and the President for the origin of the proposed law. For seven statutes the effective origin was found to lie outside the conventional legislative-executive pattern, and to abide among competitive pressure groups.

Interesting and suggestive as are these conclusions of Professor Chamberlain's, they fortify the basic generalization that legislation is manifestly a joint process in which the minds of many men have a part. As a historical analysis of the origins of ninety important legislative enactments, this study has real merit.

As a whole the volume is well written, cogently reasoned, and controlled in terms of temper, text, and organization. Proofreading is sloppily done, and one feels that Senator Pomerene would rattle within his grave at the ascription to him on page 152 of a Republican allegiance.

CHARLES W. SHULL
Wayne University

MAXWELL, JAMES A. *The Fiscal Impact of Federalism in the United States.* Pp. xvi, 427. Cambridge, Mass : Harvard University Press, 1946. $5.00.

Federalism has a kind of fascination for students of government, the fascination of things held in a balance always in danger of being lost. The forces which maintain or threaten federal equilibrium constantly change in importance. The delicate mechanisms of the federal state can best be studied under the variable strains to which they are continually subjected—in the management of elections and of foreign affairs, in territorial relations, in interstate and foreign commerce, and a variety of others.

This book is devoted to the study of public finance as an aspect of United States federalism. It undertakes to examine all federal relations in which the national and state governments have mutual fiscal interests. Using the historical method, the author brings together in succinct and comprehensive chapters the story of financial relations in defense, public assistance, education, public works, public health, law enforcement, employment compensation, and employment offices. He likewise analyzes federal relationships in the fields of taxation and the management of the public domain. The discussion of the nature, the magnitude, and the various forms of governmental grants-in-aid is especially valuable.

It is interesting that after a thorough review of the fiscal relations of our governmental system the author remains a "federalist"; that is, he believes that neither drastic centralization nor decentralization would be the cure for United States fiscal problems. Even in offering some "ideal" suggestions for federal revenue-expenditure equilibrium, the author is aware of the fact that federalism is itself a kind of "ideal." "What is needed," he says, "is the means for developing successful cooperation and integration between the Federal Government and the states in handling common governmental problems."

The mass of historical and current fact which the treatment of these topics requires does not obscure for the author the central interest in the effect of these fiscal relations upon the federal system. Perhaps he does not develop as fully as might have been done the implications of the new constitutional doctrines as to the relative fiscal independence of the states and the National Government, doctrines which greatly favor the latter. Indeed, it can be said that the National Government now possesses for its fiscal interests the protection of constitutional limitations imposed upon the states, but the states are protected from possible encroachment by the Federal Government by political considerations only. The implications of this fact for the checks and balances of a federal system deserve sober reflection.

Mr. Maxwell is undoubtedly right in believing that we shall find government a convenient instrument through which to supply more and more social services. Some of these will fall to the lot of the National Government, some to the states. He will have the satisfaction of knowing that his book will be a useful vantage point from which statesmen and scholars can take their bearings.

HAROLD W. STOKE
University of New Hampshire

CASSIRER, ERNST. *The Myth of the State.* Pp. xii, 304. New Haven: Yale University Press, 1946. $3.75.

In spite of the most enthusiastic introduction by Professor Charles W. Hendel (who edited this volume with the help of Professor Brand Blanshard for the late Cassirer), I cannot, unfortunately, work up the same fervor for the treatment by Cassirer of the origins of myth and its relation to the state from primitive times through Plato, Dante, Machiavelli, Gobineau, Hegel, and the contemporary "Great Men." There is nothing wrong with Cassirer's scholarship, and the book abounds in scholarly references gathered from far and wide. But everything seems to be wrong when it comes down to getting some definite impressions from the author. I have read Part I, "What Is Myth?" three times, and am still puzzled as to just exactly "what is myth." It seems that Cassirer cites here nearly every specialist who has dealt with this field; but he tells us what is wrong with their definitions, providing no definition to which he and the reader can hang for the rest of the book. Let me cite an example, the conclusions of Chapter II: "Myth is one of the oldest and greatest powers in human civilization. . . . If Max Müller's and Herbert Spencer's theories were right we should have to conclude that, after all, the history of human civilization was due to a simple misunderstanding, to a misinterpretation of words and terms. It is not a very satisfactory and plausible hypothesis to think of human culture as the product of a mere illusion—as a juggling with words and a childish play with names."

The sections dealing with the use of myths by various political thinkers are exhaustive and the best-systematized introduction to this topic in English; but the conclusions are just as inconclusive here as at the beginning of the book. We learn: "It is beyond the power of philosophy to destroy the political myth. It is impervious to rational arguments; it cannot be refuted by syllogisms. But philosophy can do us another important service. It can make us understand the adversary" (p. 296). The following two pages then tell us that the powers of myth can be checked. But "mythical thought then starts to rise anew and to pervade the whole of man's cultural and social life" (p. 298).

In short, Cassirer's treatment has produced a vast amount of useful information on the operation of the myths in social control. But the handling of the material is loose, faltering, irresolute. The book does not altogether digest its material; it does not altogether relinquish it. Possibly the disappointment of the reviewer is not so much due to Cassirer, who was a philosopher, as to the sociological tendencies of the reviewer. If this be the case, the volume affords an interesting illustration of how philosophy and sociology are rapidly growing apart.

JOSEPH S. ROUCEK
Hofstra College

NOCK, ALBERT J. *Our Enemy, The State.* Pp. 209. Caldwell, Idaho: The Canton Printers, Ltd., 1946. $2 50.

This reprint of a 1935 philippic against governmental action serves to remind us of some more fundamental aspects of the Hayek-Wooton-Finer controversy. Although obviously wrong and unscholarly in a number of places, Nock in some ways makes a better presentation of the conservative's fear of an omnipotent state than does Hayek. One can easily laugh at some of his bad-tempered and inaccurate remarks, such as the one that "state power has not only been thus concentrated at Washington, but it has been so far concentrated into the hands of the Executive that the existing regime is a regime of personal government. It is nominally republican, but actually monocratic." His assumption that the interests of the state and of society are "directly opposed" also sounds more choleric than scholarly.

However, Nock's main thesis is not quite so baseless. It is that "government" is a term for a minimal amount of organized political activity, and that the "State," representing more of such activity, has always been an instrument for exploitation of some economic classes by others. This Marxist viewpoint is of course carried to a conclusion directly opposite from that of the only state which professes to be Marxist. It is supported largely by a too narrowly economic interpretation of American history (documented naturally by a reference to Charles Beard). The thesis is stimulating to anyone who has genuine concern over increasing state activity. And it is nasty medicine for protective-tariff individualists.

GEORGE C. S. BENSON
Claremont College

CARR, EDWARD HALLETT. *Nationalism and After.* Pp. 76. New York: The Macmillan Co., 1945. $1.25.

Post-Napoleonic Europe was known as nationalistic Europe; and an entire volume of *The Cambridge Modern History* was devoted to nationalism in all its ramifications in Europe. Mr. Carr, professor of international politics at the University College of Wales and a wartime editorial writer for *The Times* (London), does not pretend to add much to the subject; he is more concerned with what is to follow the age of nationalism. In this brief exposition the first period of modern nationalism began with the Congress of Vienna; the second began in 1870 and ran through 1914; and the third, starting with World War I, reached its climax in 1939. The first period witnessed the dissolution of medieval unity; the second period saw the "balancing of the forces of 'nationalism' and 'internationalism' "; and in the third period we have "the catastrophic growth of nationalism and internationalism" (p. 18). "The failure to create an international community of nations on the basis of international treaties and international law marks the final bankruptcy of nationalism in the west" (p. 32). The fourth period "will probably shape the destinies of mankind for a century to come." Then we shall have internationalism as the order of the day. This will be achieved by discarding national sovereignties. The "old fissiparous nationalism, of the ideology of the small nation as the ultimate political and economic unit" (p. 37), or the idea that a nation is "the sole rightful sovereign repository of political power and ultimate constituent unit of world organization" (p. 40), may be abandoned without any loss, for "the assumption that ordinary men and women gladly accept loss of their means of livelihood or of their personal liberties as the price of freedom of their nation will be readily made only by those who have not suffered the experience" (p. 43).

The book was completed just before the end of the war. In the author's triumphant internationalism, the inviolability of the Atlantic Charter and complete harmony among the Big Three are presumed throughout. In the spring of 1945 it probably was safe to write with such presumptions; today it would seem to be a pious wish. With the advantage of hindsight, many students cannot share Mr. Carr's optimism. Nor could one share his views that "fissiparous nationalism" may easily be cast aside; for of all the fleeting ideas which have had their sway over mankind —some deity, a patriarchal chief, a medieval overlord, or a prince—the hold which the idea of nationalism exerts has probably been most constant. It would seem that neither small states nor great empires are prepared to relinquish any part of their sovereignty. We have left the nationalism of Mazzini behind us, but many of us still cling to the ultranationalism preached and practiced by his unworthy followers.

A. O. SARKISSIAN

Library of Congress

EISENHOWER, DWIGHT D. *Eisenhower's Own Story of the War.* Pp. 122. New York: Arco Publishing Co., 1946. $1.00.

Classics of literary reporting have been written about wars and military campaigns —i.e., Herodotus' *The Persian War of Invasion,* Thucydides' *History of the Peloponnesian War,* Napier's *Peninsular War. Eisenhower's Own Story of the War,* the report of General of the Army Dwight D. Eisenhower, now Chief of Staff of the United States Army, as Supreme Commander of the Allied Expeditionary Force in Europe from D-Day to V-E Day, is not such a classic.

The book is the report of a man of character, who had to make grave decisions, who had the courage to make them, and who accepted the responsibility for them, even though some are still the subject of controversy. General Eisenhower accepted the responsibility of deciding that the airborne operation against the Cotentin, in the initial assault on the Normandy coast, should be carried out. He accepted the responsibility of deciding to attack the communications system of France, even though those attacks would take many French lives. And he took the responsibility for the most fateful of all decisions, the decision of the date—June 6—on which to launch the invasion itself.

But in writing his report, General Eisenhower, commendably enough, attempted the impossible—to give an objective report on one of the great military campaigns of all time, a campaign in which he was the principal subject, the prime mover and dominant figure. As the Supreme Commander, he had an Olympian seat from which to view all the Allied planning and operations, as well as much of the enemy's; but when the invasion began, he had to descend from that perch to take a personal part in the campaign, from beginning to end. With characteristic self-effacement, he tried to eliminate the recital of that very personal participation which would have given the report spark and fire. How can an author write warmly of a great drama in which he played such an important role, and yet keep himself out of the limelight?

General Eisenhower makes the attempt. The result is a readable report for the casual reader, but a disappointment to the lover of either good historical or good biographical writing. The tensions of human uncertainty, of personal disagreements and brave decisions involved, in so gigantic, so fateful, an episode in the world's history are lacking. This is not to say that General Eisenhower writes with casual indifference to the human values involved, whether they concerned the General or the GI. General Eisenhower is incapable of any approach so cold. It is only that the impossibility of his literary task, coupled with the very brevity of the entire report (122 pages of large type), makes it beyond the power of any writer to be as fundamental and as thorough as he could wish.

The report serves a useful purpose, giving a simplified but authoritative account of the European campaign—a report which for the most part the reader can quote with surety and ease. For the scholar, the student, and the serious reader, this report is not enough. That is not to say that the report is a disappointment. On the contrary, it is a promise of the volume which it is to be hoped that General Eisenhower will write some day when leisure and circumstance will enable him to tell the full story of the European campaign as he saw it and participated in it personally.

A. ROBERT GINSBURGH
Colonel, F.A.

BEARD, CHARLES A. *American Foreign Policy in the Making, 1932–1940.* Pp. 336. New Haven: Yale University Press, 1946. $4.00.

After the First World War the isolationists succeeded in re-writing the history of our entry into that war, to make it read that we had been led down "the road to war" by Allied propagandists, by our munitions makers and international bankers, and by the mistakes of an unwise President. This was a false version, but it covered a giant hole in the isolationist doctrine, and under Senator Nye's able leadership it was sold to our people until, in April 1937, 71 per cent of us thought our part in the war was a mistake.

Building on this propaganda triumph, the isolationists then set up stout paper walls in the form of many neutrality laws, to "keep us out of war." This flimsy fortress collapsed before the ever widening surge of the armies of Germany and Japan, leaving Senator Nye and all his hosts incredulous when the Second World War came to us from the west while they were braced to ward it off in the east.

Now it is time to re-write the history of the failure of isolationism. This book is the opening gun of an effort to repeat Nye's feat for World War II. Since isolationists could not have been wrong, it is evident that somebody foxed them, and that someone was, of course, President Roosevelt, aided by Secretary Hull. After promising, with Wendell Willkie, to keep our boys from going overseas again, they actually maneuvered us into the war, outwitting the isolationists and deceiving them.

This charge is never openly formulated in this book, but it is always there, along with the implication that Hitler and Hirohito had a perfect right to conquer the world up to our borders and that it was none of our business until they reached the U. S. A.

After loftily suggesting that no human being could ever properly distribute the entire guilt for World War II, the book defends the Lodge clique which defeated Woodrow Wilson, gives thanks for the two-thirds vote for treaties requirement in the Senate, shows how the Democrats abandoned the League of Nations, how Franklin D. Roosevelt threw it overboard in 1932 under the proddings of Hearst, and how he pursued an isolationist course for several years.

In his Preface, Beard states that Edwin Borchard, of Yale University, was of great assistance in preparing the book, beginning with the collection of materials. Throughout the volume an antipathy to collective security deep enough to have been penned by Borchard is voiced. The idea of "the suppression of aggressors" or of separating "the aggressors from the peace loving nations" is the great sin, and a long line of men who held such ideas are the sinners. Even the work of Thomas A. Bailey, who detailed innumerable "mistakes" of Wilson in his recent books, is ridiculed because Bailey did come to the conclusion that the future of the American people had been betrayed in 1920.

Occasionally the occurrence of "terrible events" abroad is mentioned, but the mighty forces which demolished the illusion of our neutrality after 1937 are only suggested in these pages. The book was produced by men over whom two world wars have swept without changing their conviction that we should cultivate our own continental garden and let "the law" take its millennial, if suicidal, course.

It is possible for individual men to remain thus rooted in their earlier beliefs, but nations cannot. They must respond to the compulsions of an ever changing world or perish. In the atomic age especially, it will not be feasible for the isolationists to revise the history of World War II in the image of their own dogmas. Our "entanglement" in one world war may be successfully explained away, but our "involvement" in two cannot be.

We permitted the isolationists free rein after World War I. They took over and wrote their own ticket. They had full sway during the decisive period from 1918 to 1933, when world peace might have been organized and stabilized. They even called the tune down to 1937 and in large degree afterward. But they could not prevent us from seeing that a giant fascist pincers was forming around the United States, one which would close upon us with all the hideous forces at its command if we allowed all possible friends and allies to be crushed one after another.

The new effort to turn the clock of history back will have some vogue, but it will not succeed. The isolationists cannot shift the responsibility for their failure in the nineteen-twenties upon those who had to deal with the consequences.

D. F. FLEMING

Vanderbilt University

FISHER, HAROLD H. *America and Russia in the World Community.* Pp xii, 175. Claremont: Claremont Colleges, 1946. $2.50.

International relations remain the topic of the day, transcending any and every subject touching our lives; and Russo-American relations form the hub of international relations. For this reason this modest but important contribution is timely and welcome. In these lectures, delivered at the Associated Colleges at Claremont early in 1945, the author briefly outlines American-Russian relations Early in the nineteenth century these relations were neither close nor cordial; the geographical factor ruled out such relationships. But the era of imperialism and technological developments first reduced this factor and finally it has been all but eliminated. Once in the middle of the nineteenth century Russian expansion came so close to us that we purchased Alaska partly to keep Russia at a safe distance. In the Far East once more we felt that our interests were being endangered by later expansion of the same power, and once more we attempted to check it by the open door. During World War I we found ourselves fighting on the side of Imperial Russia as an Associated Power, and at the end of that war, when Russia's imperial government was overthrown, we refused to have anything to do with the new rulers. Then at the turn of a new era in our history we recognized Russia's Soviet government late in 1933. This "was an informal affair," for the "documents in the case were letters between the President and Litvinov." From 1933 to the fall of 1939 our relations with the Soviet Union were formally friendly. That friendship was decidedly cooled by the bombshell disclosure of the Soviet-Nazi pact of August 31, and it reached freezing point by the Soviet's "unjustified" attack on Finland. This relationship continued until Hitler's attack on the Soviet Union in June 1941. Then began our close association with the Soviets which has taken us to the United Nations Assembly in New York.

Will this association continue in mutual understanding for the sake of world peace? The "problem is how to make possible the co-operation of the two most powerful elements in the world" (p. 122). So it seems, but the "one world or none" argument weakens the author's advocacy of co-operation. We paved the way for wartime co-operation through lend-lease; as proof of that co-operation we supplanted lend-lease by the United Nations Relief and Rehabilitation Administration, which in due time will probably be followed by outright "loans." What is the Soviet Union's contribution to this co-operation? Many similarities and dissimilarities exist between the Soviet citizen and the American; they both are human and, left to themselves, they probably will behave in ways which will result in mutual benefit. Actually, the Soviet citizen is not free in his behavior, and that is ***the problem***. Barring the solution of that problem, there seems to be no easy way of co-operation with the Soviet Union in the immediate future except what Brooks Atkinson calls "an armed peace."

A. O. SARKISSIAN
Library of Congress

HAYES, CARLTON J. H.. *Wartime Mission in Spain, 1942–1945*. Pp. viii, 313. New York: The Macmillan Co., 1946. $3.00.

If this interesting account of Professor Hayes's nearly three years in Spain during the most critical period of World War II is not history—and much of it is—it is at least good raw material for history. Aside from the prospect of royalties (probably a very minor consideration), two motives seem to have prompted its publication at this time: defense of the policy of the State Department and of the Ambassador's work and support of the Franco government—or, what amounts to approximately the same thing, presentation of a strong argument against any intervention from the outside to effect Franco's overthrow.

The first objective, in the opinion of this reviewer, is perfectly justified, and the defense, ably presented, should be carefully pondered by all who desire to understand both sides of the question. But not a few may regret that the second motive was brought in and the defense of Franco undertaken. This part of the volume, however, does not occupy much space, and it has the advantage of putting the reader on guard.

The problems that confronted the Ambassador and his manner of dealing with them are presented with clarity and charm. Practically all of the problems were solved; hardly any important issue was left pending when he departed from Spain early in 1945—except what some may consider the main issue, namely, toleration of the dictator himself.

The volume sticks close to the main theme, diplomacy. The author has little to say about social and cultural conditions in Spain, about education, the distribution of wealth, taxes, concentration camps, prisons, health, families grieved because of hundreds of thousands in exile, or the heavy load of taxes occasioned by a large army and bureaucracy. He traveled widely; but he was no Jefferson profoundly concerned with the life of the people, peeking into factories, homes of the workers, farmhouses, common schools, prisons, and cupboards—or if he was, his book fails to reveal it. What he records discloses no warm sympathy for the common man; he merely mentions visits to castles, cathedrals, art galleries, chamber of commerce, and commercial fairs.

It must be pointed out, in fairness to the Ambassador, that he does not entirely approve of Franco and that he expresses disapproval of dictators on general principle; but one surmises that he considers the Franco government better than the government that would follow if the tyrant were forced to abdicate. He contends that Franco, in his rise to power, had not merely the support of the Army but the backing of at least half of the Spanish people. He favors leaving the dictator to be dealt with by the Spaniards alone, and accepts the lack of any important revolt against the tyrant as proof that they are fairly well satisfied with the government they have. He fails to mention the embargo set up by the United States and Great Britain against the legitimate Spanish Government at the time of the Franco Revolt, and forgets that the bombing plane, the army tank, and the radio have placed the problem of getting rid of tyrants in a new setting.

The Spanish dictator does, however, pose a difficult problem in international relations. Was the decisive factor in Franco's successful thrust for power the aid he received from the despots of Germany and Italy? If so, can the injury to the Spanish nation be redressed without inflicting further and greater injury? And what effect will the policies of the allegedly democratic countries toward this dictator have upon the attitude of western Europeans and the Russians?

Professor Hayes was a capable diplomat. He did not formulate policies; he merely executed them. (Apparently Sumner Welles was responsible for his appointment.) In view of the time and the circumstances, the policies he carried out were probably wise. About the postwar policy he is advocating with respect to Spain's tyrant, not a few will have grave doubts.

Like most others who have written about contemporary Spain, Professor Hayes has not written impartially. But his work deserves careful reading. It is the work of an honest and able patriot whose views should not be too lightly dismissed.

J. FRED RIPPY

University of Chicago

CHATHAM HOUSE STUDY GROUP. *British Security.* Pp. 176. New York: Royal Institute of International Affairs, 1946. $2.50.

The strain of two world wars, the approaching exhaustion of some of her mineral resources, and the diminishing defensive value of her insular position have made Britain apprehensive. She rules neither the waves nor the air lanes; she has become a debtor country; she is overshadowed by the United States and Russia; and the Dominions, fellow members in the British Commonwealth of Nations, pursue policies dictated by their own special interests. Not only Britain's imperial position but her very existence as a power may be in serious danger. The defeat of her enemies has failed to restore to her people their old feeling of strength and security.

A realization of this fact has prompted a Chatham House study group to prepare a brief analysis of Britain's present position in the world. Following the example set by Mr. Churchill in the dark days of 1940, the scholars who have undertaken this task do not gloss over stark realities. A brief sketch of the traditional British foreign policy precedes concise statements of the sources of Britain's strength. But the greater part of the report is devoted to discussions of her relations with the Dominions, the United States, Russia, and the European states, and of her position in the Middle East and the Pacific. The undertone is pessimistic. Clearly, unless an effective world organization is established, a sense of strength and security will not return to the United Kingdom. The authors of the report find consolation in the fact that the British people "rarely drive their differences to the danger point"; by forming a solid phalanx behind their leaders, they may still carry weight when world problems are in the balance. It is hoped that the Dominions and the United States will realize that their interests coincide with those of Britain. However, in the final analysis her security depends "on the fulfillment of the Charter [of the United Nations], the whole Charter, and something more than the Charter."

The report is based on extensive study and serious reflection. It is a sober, scholarly, and thought-provoking treatise.

PAUL KNAPLUND

University of Wisconsin

BEVERIDGE, SIR WILLIAM. *The Price of Peace.* Pp. 160. New York: W. W. Norton & Co., 1945. $2.00.

Lord Beveridge of Duggal, better known as Sir William Beveridge, is widely known for two books: the "Beveridge Report" dealing with social security, and *Full Employment in a Free Society* which dealt with the problem of creating work for all. In these works the distinguished economist limited himself to England; his diagnoses as well as his prescriptions were for the English. In this book the author ventures into a new and wider field; here the whole world is his domain and he deals with a subject that touches everyone living. He states that "peace is a good which, . . . can be won at a price. . . . The price, . . . can be paid only by those who have something to give, by the 'haves' rather than by the 'have-nots.'" The "haves" lost their chance to secure peace at the end of the last war because they were not willing to give something as the price of peace. During interwar years when the claims of justice and the national policies of states came into conflict the latter won out solely because "the scales of justice are vain without her sword." The League had no teeth; the only weapon at its disposal was public opinion. The inefficacy of that weapon is now beyond doubt. In a lasting peace the rule of law will be supreme; national sovereignties as well as national armaments will be brought under the rule of law. This rule of law will be enforced by an authority endowed with power. The author does not go into the details of creating such an authority; he calls it "supernational authority" and adds: "There must for every citizen be two governments elected by and responsible to the citizens: a national government for national affairs and an international government for international affairs." And of course the citizen is expected to be loyal to both governments.

The author's reasoning is clear and it is forcefully expressed. What he says is hardly arguable, and the price of peace asked for in this book, when set against the cost of war, is infinitely small By the payment of that price nations will not bear any hardships or be subjected to much inconvenience; by the surrender of a portion of their sovereignties nations surely will lose nothing, provided they all agree to surrender. That, to this reviewer, seems to be the price of peace. If nations agree to surrender what is not essential to their safety and welfare, and also resolve to see to it that what is surrendered is not appropriated by some unruly ones among them, then there is some chance for a durable peace.

A. O. SARKISSIAN

Library of Congress

MOCKFORD, JULIAN (Ed.). *Overseas Reference Book of the Union of South Africa.* Pp. 567. New York: Todd Publishing Co., 1945. £5.5s.

This book is an excellent compendium of economic, social, and political data concerning the Union of South Africa, and also contains a general survey of the mandated territory of South West Africa and the three British High Commissioner's territories of Basutoland, Bechuanaland, and Swaziland. As a handbook intended to give ready information to the exporter and businessman in general, it places primary stress on the economic aspects of the South African areas by offering numerous and detailed economic statistics up to the year 1943; but, no doubt because of the restriction which during the war was placed on economic information, in some instances only the prewar period is covered. If this be a shortcoming, it is not a serious one, inasmuch as the economic data of the war years are not a reliable indicator of South Africa's normal economic activities. (Since the publication of the book more recent data have become available in the normal official sources.)

The general reader will be interested in the first section of the book, which offers special articles by recognized authorities on such matters as history, constitution, public finance, labor conditions, population, and so forth. This section of the book provides background material in a condensed form. The bulk of the book is, however, contained in sections 2 and 3, which deal with production, industry, and marketing, and which offer detailed information about all phases of the Union's economy. Other sections present in a well-arranged manner a detailed guide regarding towns and cities, an analysis of population data of the 1936 census, and regulations regarding taxes, customs, and trade. The population analysis is slightly out of date now that the provisional returns of the 1946 census have been released. The book also contains the official government directory as of date of publication. It lists commercial and cultural organizations, all newspapers and periodicals, and a complete list of official publications since 1939. Many general and specialized maps add substantially to the general usefulness of this reference book.

Although commenting favorably on the arrangement and the scope of the book, the reviewer must refrain from judging the substance of some chapters dealing with a great variety of subjects. While a few, perhaps minor, inaccuracies have been noted in the first section, these should probably not detract from the generally high quality of the book.

H. A. WIESCHHOFF

University of Pennsylvania Museum

SOLJAK, PHILIP L. *New Zealand: Pacific Pioneer.* Pp. 197. New York: The Macmillan Co., 1946. $2.50.

This is one of a number of relatively recent books designed to acquaint Americans with the smallest and most progressive unit of the British Commonwealth of Nations. The first two chapters are given to locating and describing "the long bright land" and to its history. The next considers its economic development and status and tells the story of New Zealand's politics as well, culminating with the triumph of the Labor Party in 1936, which is still in power. There follows a discussion of New Zealand's social legislation and standard of living. Education, art, and the outdoors are then briefly described. The longest chapter tells the story of New Zealand's notable contribution to the Allied effort in the recent war, which leads naturally into the discussion of New Zealand and "the new Pacific." A well-chosen bibliography is added.

The book is not so detailed or so thorough as Frederick Wood's *Understanding New Zealand,* especially with respect to the social, economic, and political aspects. It does, however, meet the requirements of an up-to-date, readable introduction to life as lived in these islands. It makes clear that political controversy, at least in these later years, is not in terms of direction but rather of tempo. It gives the long list of social legislation in which this young nation scored firsts, but points out, on the authority of American military men, that so far from social security making New Zealanders soft, New Zealand produced the Allies' best fighting forces because its Army knew perhaps better than any other the privileges of freedom.

Some of the mistakes of the country, particularly in the administration of some of the mandated territories, are treated a bit tenderly; but in the main, this is a fair appraisal and an excellent first book for one interested in this delightful and democratic nation.

EDMUND DES. BRUNNER
Columbia University

ROCHE, JEAN DE LA, and JEAN GOTTMANN. *La Fédération française, contacts et civilisations d'Outre-Mer.* Pp. 642. Montreal: Editions de L'Arbre, 1946. $3.00.

At bottom, *La Fédération française* is a proposal for saving and developing the French Empire by converting the metropolis and its dependencies into a federation. The book falls into three parts—a brief historical account of the French Empire, its colonial theories, and its contemporary problems; a bulky, useful description of the geography, ethnology, economy, and administration of France overseas; and a well-argued proposal for a French federation. It stresses the civilizing influence of France, and its hero is Félix Éboué, "un grand Français," the first Negro Governor General in Africa.

The authors recognize the necessity for reconstituting the French Empire after the war. They reject emancipation, mandates, internationalization, and trusteeship, and favor a continuation of the French Empire on a new or federal basis very similar to the dominion system of the British. They propose a single federation for France and her present empire, with theoretical equality for its autonomous states. Over all is to be a federal government possessed of very extensive powers including maintenance of armed forces and formulation of foreign policy. Representation in the federal parliament will be by population size; hence, the colonial representatives could outvote the metropolis if they could ever coalesce. The seat of the federal government would, of course, be in Paris. The proposed constitution outlaws any legal distinctions of color, race, or class.

The authors consider more than federalism. The question to assimilate or not is met by seeking a middle way between "assimilation pure and simple and evolution in a closed circle . . . fatal to the country concerned" (p. 48). The old French policy of considering colonial cultures different rather than inferior must be continued. Nor is *la mission civilisatrice,* as Ferry lovingly called it, to be neglected. "In reality," Éboué is quoted with approval, "we constitute a great association whose end is the amelioration of the lot" of our peoples by guiding them on the long, difficult way of evolution of native cultures, not by assimilation or mere Frenchification. The authors hold that the unity of the empire is above all a spiritual problem. Progress, they insist, must be measured in terms of human well-being, not railroad mileage. The recurring stress on respect for the personalities and customs of colonial natives and the constant repudiation of exploitation add to the stature of the authors.

This careful and useful examination of the problems of France overseas is founded on a wide knowledge of colonial theory and anthropology. It is the work of anti-Vichy republicans whose thinking is patriotically French, ethical, and well informed

GARLAND DOWNUM

Arizona State College

MASON, JOHN BROWN. *The Danzig Dilemma.* Pp. xiii, 377. Stanford University, California: Stanford University Press, 1946. $4.00.

This is a comprehensive, well-documented, and objective study of the Danzig experiment and at the same time an interesting history of Danzig between 997 and 1939. The working of international authorities such as the Danzig-Polish Harbor Board, of the Polish-Danzig customs union, the mixed postal and railroad systems, the functions and activities of the League of Nations and the High Commissioner as guarantor of the Danzig Constitution, protector against foreign aggression, and adjudicator and mediator of disputes, are described in detail. The discussion is based on personal acquaintance with the Danzig scene and a wide documentation which, however, hardly includes Polish materials. The author justly believes that the lessons of the Danzig experiment should be heeded wherever one people demands access to the sea and another nation does not want to relinquish part of its national territory to a not too friendly neighbor. Danzig should point the way to a sensible solution of the Trieste question. Despite many crises and the ultimate failure of the experiment, Dr. Mason believes that the Danzig "arrangement was better than either of the crude alternatives—leaving Danzig with Germany on the score of self-determination, or handing it over to Poland on the score of access to the sea." The emphasis is on "crude alternatives," since many details of the arrangement were highly unsatisfactory. The author offers various suggestions as to how the historic Danzig settlement could have been improved. The reviewer agrees that compromise was the only wise solution to the problem of Danzig, and in future will remain the only sensible manner to settle kindred questions. It is thinkable that more effective organizations can be devised which, however, may be somewhat "undemocratic" in all those cases where the compromise will have to be imposed upon the local population. (This is one of the disputes between Russia and the Western powers concerning Trieste: shall the city be administered by its own people according to their own wishes, or by the United Nations according to the interests of the international community and possibly in disregard of local desires?) Settlement of the Danzig kind can work only if and when the international organization, be it the League of Nations or the United Nations, is strong and capable of imposing its rulings; it cannot work if the international organization ceases functioning and abdicates as supreme administrator, as the League did after 1933. Since any international organization will have its ups and downs, the question arises which kind of compromise should be worked out. Would it not be more advisable to solve "Danzig problems" in a manner acceptable to *both* litigants and to establish a structure which would continue to stand even after a *carence* of the international body? The Danzig settlement was not so constructed. Moreover, it is pertinent to ask whether the establishment of the Free City and the Corridor was not the main cause of the Polish-German conflict, keeping German nationalism at high pitch and thus contributing to the emergence of the Nazis as the strongest German party and ultimately to the Second World War. True, good will on both sides could have made the Danzig settlement a success in spite of its many shortcomings; but it is unwise to expect good will under similar circumstances. Hence the second question arises, whether the aspirations of both Poland and Germany could not have been satisfied by more ingenious geographical arrangement. After all, a corridor through one's own territory is a kind of frontier which will hardly anywhere elicit enthusiasm and which will never prove stable. The problem was not to give Danzig to Poland, but to provide Poland with a suitable access to the sea. Such an access could have been found farther to the east, for example at Tilsit, or even at Königsberg. It is conceivable that a solution that would have steered clear of artificial boundaries and left Germany with a continuous territory would have been more conducive to European stability. It is a virtue of this excellent book that it shied away from more general questions and concentrated on specific administrative and regional problems, but the wisdom of the Danzig solution can be judged only from the point of view of Europe as a whole. Was it entirely an accident that the Second World War began in Danzig? However that may be, it would be a pity if new ventures in international cities were started without the peacemakers' first taking counsel from Dr. Mason's instructive facts and conclusions.

STEFAN T. POSSONY

Georgetown University

NATHAN, ROBERT R., OSCAR GASS, and DANIEL CREAMER. *Palestine: Problem and Promise.* Pp. x, 675. Washington: American Council on Public Affairs, 1946. $5.00.

In their book on Palestine, Messrs. Nathan, Gass, and Creamer have presented what is probably the soundest economic study of that country available at the present time. A book that should be read and studied by every real student of the Palestine question, it is yet one that can have great interest for the average reader. One of its greatest values lies in its high degree of objectivity—a condition sadly lacking in most present-day volumes concerned with Palestine.

Approximately half the book is taken up by a presentation of the historical background and a discussion of the present-day economy of Palestine in all its various phases. This section is likely to prove the more interesting to the general reader, since it not only puts Palestine in proper world perspective and gives a very good description of the country, but it also contains one of the fairest statements of the whole Palestine problem. The case for Jews, Arabs, and British is presented and judged with great fairness and clarity. One cannot but have a feeling that here there is little bias and no propaganda.

The second half of the book deals with economic potentialities: what may be done in Palestine during the next decade. These potentialities are based on a number of surmises, the failure of any one of which could upset or change the whole picture. However, statements are based on the best available sources and they have a ring of authority. There is no wishful thinking; only the hard facts of present conditions and known resources are used to figure out future possibilities. No one is more aware than are the authors that the actuality may turn out very differently from the projection. But their projections are economically sound, and wholly possible provided future events are permissive.

A few words should be said in praise of the many tables of figures that appear through much of the book, the sources of many of which are not at present available to the public. These figures not only give authority to the statements presented, but are a valuable key to source materials for students of the area. Of similar value are many of the acknowledgments and notes that appear in the Appendix.

JOHN R. RANDALL

Ohio State University

WOMER, PARLEY PAUL. *Citizenship and the New Day.* Pp. 319. New York: Abingdon-Cokesbury Press, 1946. $3.00.

The confident belief in the superiority of political democracy and in its ultimate universal adoption that prevailed during the first part of the century has gone. Students of government in increasing numbers are re-examining the whole field, as to both its organization and its basic principles. This book belongs to the ever increasing list of titles on this subject. Dr. Womer still has faith in the principles of democracy on which the United States Government was founded, but he does not believe in the automatic competence of the people to make these principles work effectively.

The Constitution, Dr. Womer points out, vests the final political power in the people. The suffrage has been gradually extended until it includes the bulk of the adult population, male and female. This has been done on the prevailing assumption of the natural competence of the citizens; that the vote in the hands of the citizens will automatically be used by them as a means of their own protection and as an instrument to secure their own best interest. Following this major assumption we have spent the greater part of our efforts in developing the technical organization of the government in such a way that the citizenry can function effectively as a collective body. The greatest threat to democracy today comes from the error in this major assumption.

Natural competence to use the vote wisely does not exist. But there is a potential competence in the citizenry that can be elicited by education and experience. The people must understand the responsibilities that go with liberty; the importance and meaning of equality of rights; the place of the group in the whole; the relationship of social justice and free enterprise; the necessity for a court system that will, in fact, give equal justice to all. Such concepts must be incorporated in the thinking of the people and become the basis of their action, public and private. They are not natural in man, but must be acquired by education and experience. The process of education is the responsibility of the family, the school, the church, and the civic groups. The hope of the survival of democracy rests on the success these groups have in developing the competence of the citizenry, rather than on the technical organization of the government.

Dr. Womer has that unique ability to discuss fundamental problems without becoming academic, of being dynamic without being superficial. Any civic group interested in the preservation of democracy and in making it function effectively should find this book very helpful.

FRANK PADDOCK

Temple University

HOGAN, JAMES. *Election and Representation.* Pp. iv, 293. Oxford: B. H. Blackwell, Ltd., 1945. 15/–.

The author of this useful volume, a professor of history at University College, Cork, almost succeeds in filling a great void which has existed for some time in the field of representative government. He devotes the last two-thirds of his study to the theoretical implications of representative government after presenting a long, discursive, and not very penetrating introduction and an excellent Part I covering Irish experience with proportional representation.

Part I makes a noteworthy contribution to our knowledge of P.R. in Eire. The author can scarcely be called a friendly critic of P.R., but he uses as his criteria first, "whether P.R. has in practice proved to be a source of strength or of weakness in the evolution of our parliamentary democracy," and secondly, "whether on a broad view, P.R. may be said to compare favourably or unfavourably with the majority method of voting," and lastly, "whether our experience holds any clear practical lessons for the future." He concludes that "P.R. in Eire falls sufficiently short of assuring the election of candidates in proportion to votes to tilt the balance definitely in favour of the large parties. What we have in Eire is a compromise between P.R. and the plurality method of voting, with P.R. still the dominant element in the combination." The development of this latter point by discussing the effect of the electoral act of 1935 in increasing the number of constituencies returning fewer than five members each is very well done. The author believes in a fresh compromise between P.R. and the majority system.

Like Hermens in an earlier book, Dr. Hogan dislikes coalition government and argues for resounding victories and for government by the people instead of through a "parliamentary oligarchy" effected after elections. But he brushes aside experience in Sweden and Switzerland which is to be contrary, and he stigmatizes the Irish Labour Party as an interest group. Minor parties are embarrassing and multiparty situations are difficult, but it does not help much to compress them artificially into only two parties, or to write them off altogether.

The author's discussion of Burke, of occupational representation, of the evolution of parliamentary representation, and of the "fiction of representation" is very stimulating, even though one has to endure fear-fully long sentences. An appendix giving the returns for both the British and Northern Ireland General Elections of 1945 is included in the book, and there are other tables of figures for all the parliamentary elections in Eire.

JAMES K. POLLOCK
University of Michigan

NOBLE, RANSOM E., JR. *New Jersey Progressivism Before Wilson.* Pp. 175. Princeton: Princeton University Press, 1946. $2.00.

This little volume is a useful addition to the literature on the progressive movement. It sketches the economic and political issues which occupied New Jersey liberals of both major parties during the first decade of this century. The treatment is thoughtful and sympathetic without being emotional. Although at one point New Jersey is referred to as a "leading progressive state," the author generally preserves a good sense of proportion in relating the accomplishments in New Jersey to the larger framework of progressivism.

Good use has been made of interviews with some of the leading participants in this movement. It is unfortunate, however, that only a few private letters have been unearthed. Apparently the only available letters are a few of Everett Colby's covering the 1905 campaign, and some later correspondence of George L. Record which only looks back in retrospect on the progressive period. Nevertheless, Dr. Noble in this book has done a good research job in assembling and organizing his material from official and newspaper sources. Incidentally, the book proves again what an excellent political reporter was Lincoln Steffens.

New Jersey was one of the most difficult states for the progressives to crack. It was not alone because political and corporate power had such a strangle hold, as the author explains. It was also because this state had neither the rebellious tradition established by the Populists nor the huge agricultural population which sparked the movement throughout the western states. The gains achieved were hard-won.

Commencing with a treatment of Mayor Mark M. Fagan's career as the liberal Mayor of Jersey City, the book analyzes Everett Colby's progressive triumphs in Essex County, the attempts of the "New Idea" men to achieve reform in the state legislature, and the laws they pushed through in regulation of utilities, in railroad valuation, and in democratization of the state political machinery. Although eight pages are devoted to labor legislation, the progressive emphasis on child labor and employer liability laws was actually very minor in comparison with railroad, corporation, and political reforms.

In addition to his intelligent accounts of the economic and political issues involved in New Jersey progressivism, Dr. Noble makes some astute comments on the leading personalities in the movement. George L. Record emerges as an important figure who dominated the intellectual thought of the period, but his utter naiveté in practical politics becomes apparent. Record's ineptitude in personal contacts and carelessness in official positions prevented him from rising to greater official prominence in the state.

The author makes frequent references to the relation between the rise of the progressive movement in other states and the developments in New Jersey. It is regrettable that he dismisses with a brief footnote the fact that one of the leaders in the fight against "Uncle Joe" Cannon in the House of Representatives was a New Jersey Congressman—Representative Charles N. Fowler.

The concentration of liberal sentiment in Hudson, Essex, and Passaic counties made progressivism a sectional movement confined to northeastern New Jersey. Nevertheless, the author is correct in his conclusion that it not only achieved many economic and political reforms but provided the educational background paving the way for the sweep of liberal legislation enacted under Governor Woodrow Wilson.

KENNETH W. HECHLER
Bureau of the Budget
Washington, D. C.

SALTER, J. T. (Ed.). *Public Men In and Out of Office.* Pp. xxii, 513. Chapel

Hill: University of North Carolina Press, 1946. $4.00.

This is a sad and discouraging book to read: sad because so much of the writing is turgid and pedestrian; discouraging because the examples of statesmanship set forth are not of the quality to raise the hopes of those who are concerned for the future of their country. With a few exceptions such as Wendell Willkie, who is dead, Henry Wallace, who is fallen from power, Joseph Ball, who is courageous but lacking in political "savvy," and John Winant, the men discussed are mediocre at best. In the cases of Bilbo, "Cotton Ed" Smith, and Frank Hague, mediocre would be a term of praise.

Notwithstanding the depressing effect of the volume upon the reader, the book is worth reading. It brings into a single volume interesting anecdotes and some information about no fewer than twenty-seven of America's public men. Those who appear in this gallery are: Harry S. Truman, Joseph Clark Grew, John G. Winant, Joseph C. O'Mahoney, Sam Rayburn, J. William Fulbright, Hamilton Fish, Alben W. Barkley, Theodore G. Bilbo, Tom Connally, Ellison Durant Smith, Thomas Edmund Dewey, Robert S. Kerr, Frank Hague, George S. Messersmith, Wendell Willkie, Henry Agard Wallace, Gerald P. Nye, Robert L. Doughton, Adolph J. Sabath, Sol Bloom, Claude D. Pepper, Joseph H. Ball, Jerry Voorhis, Harold Edward Stassen, John W. Bricker, and Earl Warren.

I have no doubt that Professor Salter made every effort to see that the articles were objective and informative. But with the exception of the pieces on Wendell Willkie by Wilfred Binkley, John Winant by Montell Ogdon, Earl Warren by Thomas Barclay, and Alben Barkley by J. B. Shannon, there is little evidence of objectivity.

Some of the articles read like campaign documents. Heaven knows, I would be the last to defend John Bricker as a great statesman, but he deserves a more objective treatment than that given in the article on him by Mr. Seasongood. On the other hand, the article by Graham Stuart on George Messersmith and that by Claudius Johnson on Jerry Voorhis might well have been composed by publicity men in the employ of those surveyed.

S. Burton Heath informs us that "one of Mr. Dewey's most aggravating traits is that he thinks faster and straighter than most of those with whom he comes in contact." According to Mr. Heath, Tom Dewey is a lover of logic and straight thinking. Unfortunately, most of the evidence for this is left to inference or to such vacuous statements as "Government intervention need not be destructive of an honest system of free enterprise."

The concept of the book and the analysis of the "Voters Politician" by Mr. Salter are excellent. It is unfortunate that he did not write more of the book himself. No reader tolerably familiar with the American scene will find much that is new in this volume. As a handy compendium of well-known information, however, it should be useful. When one contrasts it with a book like William Allen White's *Masks in Pageant,* he realizes what an opportunity there was, and how almost completely it was lost.

PETER H. ODEGARD

Reed College

ABELE, RUDOLPH VON. *Alexander H. Stephens.* Pp. xv, 337, x. New York: Alfred A. Knopf, 1946. $4.00.

In the struggle between the states which culminated in the Civil War, each side possessed what appeared to be decisive advantages. While the North had numbers, wealth, and material resources, the South seemed to have leaders, both political and military, superior to any its opponent could offer. When hostilities broke out, the first triumphs all went to the Confederacy. Her generals showed qualities of imagination and professional competency which far outshone their rivals. Richmond too seemed to present a more competent, more dynamic executive array than Washington. Strength of will and purpose stood revealed there; while across the Potomac Lincoln and his advisers hesitated, fumbled, backed, and filled.

Yet this was a matter of surface seeming alone. The South was better served in administrative talent and harmony at the outset than it ever was later on. Lincoln, on the other hand, was feeling his way and learning. Soon his talents for quiet synthesis, for leading strong men to contribute their strength without ever being able to grasp undue power, asserted themselves. In Richmond the process was all the other way. The stable of prima donnas never became a team; each was determined enough to continue pursuing his own course, but not clever enough to impose it on the rest. Jefferson Davis was at once stiff-necked, erratic, and tactless. Hence he collided head-on with Alexander Stephens, equally stubborn, even more neurotic, with a passion for his own conclusions which opposition hardened into bigotry.

Dr. Von Abele is at his best when he is examining this gradual deterioration of leadership, this clash of wills which drove Stephens to behavior which charity will call bad judgment, and objectivity something close to downright treason. The author has also grasped reasonably well Stephens' course of action after the war. His basic love of the Union made him at first a doughty champion of reconciliation, only to have his attitude eroded by the twin acids of racial bias and bad health. It is a pitiful and ironic spectacle Stephens' popularity grew, but it must have turned to ashes as he contemplated it from within. His powers were declining, mental as well as physical, so that at the end he suffered from a senility as unlovely as any which ever eclipsed a first-rate mind.

Beyond this, Dr. Von Abele has not a great deal new or incisive to offer His grasp of the forces which molded Stephens' early career is, it seems to me, not at all secure. He often takes refuge in oversimplification, as for example his comment on those who fought our entry into the war with Mexico: "The opposition had, in fact, only a lame leg to stand on. California was there: unless Britain got it, America would have to get it eventually; Mexico could not voluntarily give it up; therefore the only way to get it and save face was to provoke Mexico into war and claim it as our indemnity. The dispute between Mexico and America over the Texas boundary was the perfect *casus belli:* Mexico was weak and America was strong. And therefore America's taking what she wanted was as natural as a cat's killing a bird." The account of the currents and crosscurrents of the fifties, when every event and every emotion seemed freighted with inexorable doom, along with Stephens' share in them, is equally devoid of profoundness or subtlety.

ALPHONSE B. MILLER

Philadelphia

TANSILL, CHARLES CALLAN. *The Congressional Career of Thomas Francis Bayard, 1869–1885* (Georgetown University Studies in History). Pp. 362. Washington, D. C.: Georgetown University Press, 1946. No price listed.

Thomas F. Bayard was of the third generation of his family to represent Delaware in the Senate of the United States. He began his senatorial duties in 1869 and promptly became an outstanding Democratic leader. His consistent opposition to the Radical Reconstruction policy endeared him to the prostrate South. In 1877 he promoted and served on the Electoral Commission that determined the outcome of the Hayes-Tilden contest. His Presidential aspirations were frustrated in 1880 and 1884 by Tilden's vindictive opposition and his inability to live down the effect of his "Dover Speech" of 1861 in which, two months after the outbreak of the Civil War, he vigorously condemned the use of force by the Federal Government against those armed to resist its authority.

This book consists of 342 closely printed pages packed solid with laboriously gathered but not too well digested source material, rather chronologically arranged. By and large, Bayard is permitted to speak for himself through his speeches, letters, and diaries, and this is supplemented by excerpts from letters received. All this is clarified by Professor Tansill's incomparable mastery of the historical background of Bayard's experiences.

This reviewer will not question the propriety of such a study if it is taken for what it is, which is certainly not a scientific appraisal of Bayard's career in the Senate. Two patterns of interpretation largely determine the treatment. One is that of the "Lost Cause" with which

Bayard was sympathetic. So Reconstruction, despite Supreme Court decision, becomes a matter of "getting the states back in the Union" and the "readmission of the states." It is difficult to see why so scholarly a study should occasionally lapse into the vocabulary of a partisan pamphlet with such epithets as Black Republicans and Black Republicanism, all without benefit of quotation marks. The second pattern of interpretation is that of present-day Conservative Southern Democracy, which affords opportunity to use Bayard's opposition to Federal aggrandizement for moralizing on the wickedness of the New Deal

The Bayard set forth in these 342 pages is unconvincing. He is simply too good to be true. Apparently he functioned in a social vacuum, the product of self-induced personal integrity and infallible reasoning on his part. Not a trace of human weakness mars the miraculous record. Rich as this book is in pertinent information, it left this reviewer wishing he could learn the circumstances and forces that account for this remarkable statesman. Why was he what he was?

WILFRED E. BINKLEY
Ohio Northern University

HAZLITT, HENRY. *Economics in One Lesson*. Pp. xi, 222. New York: Harper & Brothers, 1946. $2.00.

Economics in One Lesson is a popular rendition of classical economics. Whether one agrees with such economics or not, the author has clearly presented these doctrines in a most forceful fashion. The central note of this little book is that "the art of economics consists in looking not merely at the immediate but at the longer run effects of any act or policy; it consists in tracing the consequences of that policy not merely for one group but for all groups."

It is in support of this thesis that the author attacks the ideas of the followers of Keynes and Hansen. To the author their theories are fallacious because they emphasize only short-run effects and the effects of policies on special groups. Mr. Hazlitt would give impatient notice to the idea that the long run is only a series of short runs, and he labels "In the long run we are all dead" a shallow wisecrack

In the light of their long-run effects on the whole economy, the author considers briefly governmental public works programs, governmental credit extension, spread-the-work schemes, tariffs, parity prices, governmental price fixing, minimum wage laws, and other interferences by government with the free price economy. These to Mr. Hazlitt are merely aids to one group at the expense of another—are short-run policies which only increase the long-run difficulties.

The reviewer agrees with much that the author has to say, particularly when he argues for greater productive efficiency. There is no question that many governmental policies and trade union practices do restrict output. The reviewer would add to his condemnation restrictive policies of monopolistic and quasi-monopolistic concerns which seem to have been overlooked in *Economics in One Lesson.*

Mr. Hazlitt is also right in his contention that advocates of the mature or senile economy doctrine have not given adequate proof that continual deficit financing by government is necessary to keep the economy from collapsing. But this is not to say that deficit financing in the depression phase of the business cycle with repayments in the prosperity phase is not economically sound. Politically, of course, it is difficult to reverse the process of spending. The author admits that in the emergency of war, price controls and other governmental regulations are probably necessary. Similarly, in the emergency of a great depression, policies become desirable which should not be adopted when the economy is operating more smoothly.

EARL R. SIKES
Dartmouth College

AMERICAN ECONOMIC ASSOCIATION. *Readings in the Theory of Income Distribution* by a committee [William Fellner and Bernard F. Haley]. Pp. xvi, 718. Philadelphia: The Blakiston Company, 1946. $4.25.

This present volume of *Readings* is the third in a series put out jointly by the publishers and the American Economic Association. Like its predecessors, it consists of reprints of selected articles on a major economic topic. At the conclusion of the volume there is an excellent classified bibliography of nearly a thousand articles. Most of the excerpts used are from standard economic journals, but the volume has profited through the use of several major articles from *The Encyclopaedia of the Social Sciences.*

The bulk of the articles selected belong in the category indicated by the title, dealing primarily with *theory* of income distribution. A few articles at the beginning, however, treat of the more general theories of national income and personal income distribution.

The choice of articles reflects accurately the present state of economic theory. Thus, only one article is devoted to the theory of rent. Boulding's discussion of economic surplus, while classified under rent, is really much broader in its scope. Likewise, there are few articles on the subject of profit. Here again a reader might question the appropriateness of including several articles under this particular heading. Thus, Crum's study of corporate earnings might as easily have been listed in the section devoted to interest.

More favored by the editors are the subjects of marginal productivity, wages, and interest. In each of these cases an effort is made to include the most advanced and recent discussions on the subject. Thus, marginal productivity is examined in the light of monopolistic competition, innovations, and inventions. The treatment of interest theory is weighted heavily towards a discussion of the views of Keynes. Of current interest are the articles on wage rates in relation to costs and prices. Dunlop's analysis of the wage policies of trade unions is likewise of topical value.

In its entirety, the volume is hardly for the general reader. For teachers and advanced students of economic theory, it will be a valuable handbook. The bibliography alone would make its purchase imperative. In general, the articles selected are representative of important modern thought in the field. As is inevitable in such a compilation, there is a certain disjointedness and overlapping. On the whole, however, the editors have performed creditably their difficult task of selection.

JOHN F. CRONIN

Washington, D. C.

MENDERSHAUSEN, HORST. *Changes in Income Distribution during the Great Depression.* Pp. xviii, 173. New York: National Bureau of Economic Research, 1946. $2.50.

Early in 1934 the Financial Survey of Urban Housing, a Civil Works Administration project sponsored by the Department of Commerce, obtained information on 1933 and 1929 incomes from more than 200,000 families living in thirty-three large and middle-sized cities. Mr. Mendershausen has made major use of this unique material to analyze the effect of the Great Depression on the distribution of incomes.

Starting with changes in income levels, it appears that mean incomes declined between 24 and 51 per cent in the thirty-three cities. Cities with high incomes tended to have somewhat smaller than average reductions of income, so that inequality between cities increased. On the other hand, incomes of home owners, which were higher than those of tenants throughout, declined faster, tending to lessen differences between the two tenure classes.

Regarding changes in income inequality, the study concludes that, although differences in dollar amounts declined, relative inequality on balance increased. This increase, however, was compounded of several movements: increasing inequality within the bottom two-thirds of the income distribution (due largely to the fact that unskilled and semiskilled workers are more likely to become unemployed than skilled and clerical workers, foremen, and the like); increasing inequality between the highest third and the lower two-thirds taken as groups; and decreasing inequality within the highest third (largely as a result of the decline of property income among those with the highest 1929 incomes). I have put the foregoing explanations in parentheses as I may be stating them more baldly than Mr. Mendershausen would care to.

Briefly, what this means is that the share of the national income going to the lower two-thirds of all families declined from 37 to 33 per cent, causing the mean income of the group to approximate $600 rather than $666 in 1933. The increase going to the top third did not, however, go to those with the highest incomes, as their share generally decreased. The corresponding increase in the highest third mean incomes was roughly $130 to $2,400. As the mean incomes for the sample as a whole are not given, I have improvised these estimates from somewhat scattered data, so that they are only approximate.

Shifts in the position of individual families within the income distribution mainly reflect these same forces. Over-all, between 10 and 15 per cent of those with incomes below the median in 1929 had incomes above the median in 1933 and vice versa. By classes, the relative variety of subsequent income experience is greatest for the lowest class, next greatest for the highest class, and least for the middle groups. But when these changes are measured against a standard of comparison to judge the extent to which groups are "favored" or "disfavored," it appears that those with the very low and moderately high 1929 incomes fared relatively well (beginners and apprentices on the one hand and higher salaried groups on the other), while the moderately low and very high fared relatively badly (unskilled workers subject to unemployment and those with property incomes).

In general, Mr. Mendershausen's volume lives up to the standard set by studies of the National Bureau of Economic Research, but by the same token it cannot be recommended to the casual reader, especially as major emphasis is placed on methodology. In fact, if I have any criticism, it is that the work appears more concerned with techniques than with presentation of results. But above all, it is to be hoped that more data will become available and more work along these lines will be done, as the questions remaining are as numerous as those answered.

HENRY H. VILLARD

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STIGLER, GEORGE J. *The Theory of Price.* Pp. 340. New York: The Macmillan Co., 1946. $3.75.

It may be said that the scarcity of adequate textbooks in the field of advanced economic theory has been materially reduced with the appearance of Dr. Stigler's praiseworthy work, *The Theory of Price.* This volume, in the words of its author, "is an augmented version of *The Theory of Competitive Price,* and now includes a survey of imperfect competition, multiple products, and interest theory. It thus covers the main topics of modern price theory—that is, the mechanism of the stationary enterprise economy. The other two branches of economic analysis, the theory of fluctuations and the theory of development, are not discussed." (Preface.) Only minor revisions of the earlier study, which now appears as Parts I and II of the augmented version, have been made. More extensive revision was barred by the author's unwillingness to "embark upon patch-work changes."

The completed version now provides the foundation for a comprehensive study of pricing. Parts I and II present a precise exposition of the tools of economic analysis, methodology, basic concepts, and the elements of price; namely, the theory of consumer behavior and the production function. The problems of the pricing of finished goods and productive services are dealt with in a fashion designed to be suggestive of new avenues of thought, rather than to provide definitive solutions to these problems. Parts III and IV deal with the theory of imperfect competition, multiple products, and capital and interest To the student of economic analysis, the truly invaluable contributions are to be found within these sections, for it can be argued that they deal with forces and institutions more representative of a capitalistic economy than the limiting case of pure competition.

The style of writing is something of an innovation in that topics of considerable complexity are presented in an exceedingly brief and understandable manner, and an occasional note of humor may be detected. It must be admitted that these are qualities too often absent in works of this nature. Furthermore, the formal analysis is reinforced with the use of forceful examples, and references to current economic practices and institutional patterns. Emphasis has been laid upon precision of presentation and technique, although symbolic analysis has been restricted for the most part to footnotes and separate sections which may be omitted if these refinements are not desired. In this connection, the discussion of the theory of consumer behavior, which is based on indifference curves, may be omitted because a nontechnical discussion of demand curves is also included. Ample use of the analytic tools of the economist is to be found throughout the work, and this may prove disturbing to those who object to such relatively simple devices. Nevertheless, there is some reason to believe that inquiring students may fail to obtain full value from the work unless they possess some considerable knowledge of geometry and higher mathematics. However, students at the advanced undergraduate level who possess such a background plus a sound elementary course in the principles of economics may well improve their analytical abilities through the use of Dr. Stigler's contribution to the field of economic analysis.

LEONARD G. MATEY
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Seattle

LOEB, HAROLD. *Full Production Without War*. Pp. xviii, 284. Princeton, N. J.: Princeton University Press, 1946. $3.50.

The author's quest is to discover the causes of nonproduction. Full production is the quantity attainable with the existing labor force. Capacity production is the quantity which is technically possible. Under either definition, nonproduction is a constant though irrational phenomenon in our economy.

Starting with a basic formula, E equals QP, with E signifying "effective demand," Q the sum total of goods and services produced, and P the price—an equation which indicates "equilibrium production"—various relationships as between price, wage, profit, and capital formation are analyzed as they affect production under the changing impact of advancing technology. To maintain equilibrium calls for adjustments which consist in making use of the wealth increment created by advancing efficiency. Part of this adjustment is automatic, but the residual wealth increment may cause disequilibrium. Four possible ways of adjustment to regain balance are analyzed. They are (1) lowering prices, (2) withholding production down to the equilibrium level and laying off workers, (3) raising wages and thus increasing effective demand to balance increased quantity produced, and (4) spending "newly created debit money" on consumer goods, capital formation, public works, relief, or other purposes.

Different industries tend to react differently, according to whether the prevailing economic form in the particular industry is "price competition," as generally in agriculture, or "monopoly competition," with its administered or controlled price.

The author concludes that "the procedures of monopolistic competition" render the economy incapable of "reacting to the advance in efficiency by appropriate price changes." The adjustment therefore tends to be made "by a series of back-and-forth movements usually known as the business cycle." Such variations in production are in themselves nonproduction, since they are deviations from full production. "Consequently, the *equilibrium adjustment imposed by monopolistic competition accounts for nonproduction*" (p. 128).

The study concludes with a program for achieving full employment by a properly timed injection of new money through public works, especially public low-cost housing; by a rising and falling corporation profits tax to control the tendency toward excess capital formation in an upsurge of production, or the reverse in a downsurge; and by a basic minimum wage established by government to steady "effective demand." While the author keeps his analysis within the framework of maintaining the mechanism of the market indicated in his equation of supply and demand, he nevertheless finds his suggested solution not in the market economy, but in governmental action. Such action, however, as he explains, is to be directed toward setting free forces which should maintain equilibrium in the market of private enterprise.

MARY VAN KLEECK
Russell Sage Foundation

ALLEN, JAMES S. *World Monopoly and Peace.* Pp. 288. New York: International Publishers, 1946. $3.00.

The postwar literature of cartels is now sufficiently extensive to define sharply the various perspectives from which cartel problems may be approached. In *World Monopoly and Peace* the author surveys the familiar ground of cartel history with a view to expounding "the main economic drives behind world political events." In the main, the facts recited are those which have been placed on the public record by congressional investigations, inquiries of the Temporary National Economic Committee, and the cases which have been brought under the antitrust laws. The purpose of their restatement in this book is to subject the facts to the scrutiny of Marxism. But, as always, if ideology is Procrustean, facts must be regarded as Protean in order for the argument to achieve a semblance of plausibility. As the author notes, "facts are stubborn things"; yet no hesitance is shown in taking the most refractory data, should they threaten to break the mold of doctrine so carefully contrived, and treating them to a special process in which their significance is transformed. In this way the conclusions with which the analysis begins are not disturbed in the course of examining the evidence.

These strictures may seem severe, but an instance will suffice to illustrate their basis. According to Mr. Allen, efforts to enforce the antitrust laws against domestic monopolies and to eliminate private international cartels in world industry are in reality a cleverly calculated scheme to enhance economic imperialism. It will be news of an interesting variety to the many industrial monopolies which have been prosecuted for cartel activity that antitrust policy is actually part of a campaign to substitute the hegemony of American trusts over world markets for the rule of international cartels. Indeed, the author says that "the government anticartel policies . . . were fully in accordance with the high objectives of big business. The result of these policies, whatever their origin or motivation, was to further the expansionist drive of American monopoly-capitalism." Carrying this bizarre logic to its ultimate absurdity, we are told that the principle of economic freedom as it is understood in this country has as its ulterior aim the creation of an "American world trust."

It is hardly necessary to refute a thesis so skillfully designed to destroy its own premises. If one sets about deliberately to find a mirage and then insists that the resulting distortion of reality constitutes the only possible interpretation, others cannot be blamed if they decline to share the illusion. As George Eliot once remarked, "The penalty of untruth is untruth."

WENDELL BERGE
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BOLLINGER, LYNN L., ALAN PASSEN, and ROBERT E. MCELFRESH. *Terminal Airport Financing and Management.* Pp. xiv, 385. Boston. Harvard Business School, 1946. $4.25.

In *Terminal Airport Financing and Management*, Professors Bollinger, Passen, and McElfresh take a stand against permanent government assistance to air transportation, and—through inference—to terminal airports, since subsidization of industry militates against effective utilization of a nation's resources.

Making terminal airports self-sustaining might be resolved into a simple procedure were it not for the difficulty in determining the costs of terminal airport operation and in allocating them among the various types of airport users.

The difficulty in determining airport costs stems from three factors, namely: (1) the woeful lack of adequate financial records; (2) the fact that the construction costs of many airports have been inefficiently incurred; and (3) the fact that many airports have been built with capacities beyond present and future needs of traffic. The first factor makes the cost data altogether unsuitable for fixing airport rates, while the second and third would burden air transportation with charges which really do not belong to them.

Finding the available cost data unsuitable for airport rate fixing, the authors, through consultation with airport construction experts, build up "ideal" costs for limited stop, intermediate, and major airports, and construct rate formulae which aim at making the airports self-sustaining by 1952, and also at allocating the costs fairly and equitably among the different types of airport users.

The book fills a definite need in the literature on air transportation, for altogether too little has been written on the subject of airport operation. By calling attention to the unsatisfactory condition of airport financial records and cost data, the authors have undoubtedly contributed to the ultimate remedying of the situation.

GILBERT GOODMAN

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CRAMER, HARALD. *Mathematical Methods of Statistics*. Pp. xvi, 575. Princeton, N. J.: Princeton University Press, 1946. $6.00.

Professor Cramer's book brings together two lines of development in modern statistics, which to date have been largely independent of each other. Modern tools in the application of statistical science have been developed brilliantly by Student, Fisher, and others, with little attention to the mathematical foundations of probability, while the latter have been developed with equal success by another group of writers, mainly French and Russian. A forerunner of this book, *Random Variables and Probability Distributions*, published by Professor Cramer in 1937, belongs mainly to the latter group, but in this last volume he bridges the gap between these two developments.

The book is divided into three parts: (1) mathematical introduction, 12 chapters; (2) random variables and probability distribution, 12 chapters; and (3) statistical inference, 13 chapters. Part I deals with point set theory, the theory of measure, and other topics belonging to the mathematical foundations of the subject. The present reviewer, being a mathematician of the most amateur sort, hopes this part of Cramer's book will be reviewed by competent mathematicians and hopes they will be able to say as good things about its quality as he is prepared to say about the two remaining parts.

Part II, on random variables and probability distributions, starts with two chapters on foundations. Here the author develops, with a clearness that will be welcome to beginning students of the subject, the notion that a probability distribution is a mathematical creation designed to serve as the model for, or the conceptual counterpart of, the regularities observed in empirical frequency data. In the following chapter, on fundamental definitions and axioms, these models become a mathematical theory of random variables and probability distributions. The development includes joint probability distributions, conditional probabilities, the important special case of independent random variables and functions of random variables which themselves become random variables. This is the set of primitive or basic mathematical tools on which are later built the technical methods of sample analysis, especially sampling distribution functions.

Two further subdivisions of Part II bring this general discussion down to specific cases. A chapter is devoted to the general properties of probability distributions (discussion of moments, and of important theorems, such as mean values of sums and products, the Tchebycheff inequality, and so forth), and this is followed by somewhat detailed study of several distributions of great importance in statistics.

The discussion of the binomial and Poisson distributions, in results at least, follows a historical pattern. Bernoulli's theorem is here, and the DeMoivre development of the normal limit to the binomial. The Poisson is developed as a limit to the binomial in the traditional method with p small and n large. An important chapter on the normal curve follows, and the thing of central importance in this chapter is the central limit theorem, underlining the conditions under which the sum of a set of random variables approaches the normal form, this development being basic in so-called large sample theory, giving the conditions for the legitimate use of the normal curve in testing significance. Other important distributions derived in this part of the book are χ^2, Student's ratio, Fisher's z. Throughout the discussion of these distributions emphasis is laid on the properties of the distributions as such, and no special attention is paid directly to the fact that they are among the most important sampling distributions. They do of course appear in this role in Part III. So much for variables in one-dimension. The final subdivision of Part II carries through a similar development for two- and n-dimensional variables.

Part III deals with statistical inference, the problem of testing agreement between theory and facts. An introduction on methods of sample-taking puts main emphasis on simple random sampling, as would seem the proper course in a basic expository treatise. The next section deals with sampling distributions. Sample moments are sample estimates of the corresponding population moments (the mathematical models of earlier sections) and, being random variables, therefore have distributions and these in turn have moments. A chapter develops the circumstances under which sample moments are asymptotically normally distributed, furnishing thereby a normal theory basis for significances testing. The next chapter deals with exact sampling distributions, and its high lights cover the distributions of sample moments from normal populations (both one- and k-dimensional). Here appear distribution functions for $\bar{x}$, s^2 for simple and partial correlation and regression coefficients, and for multiple correlation coefficients. The χ^2 distribution appears again and also Student's t, into which several of the above distributions may be transformed. One of the few surprises of the book is the failure to find the binomial and Poisson distributions brought into this list, both as sampling distributions and as exact distributions. (This does not of course refer to the Poisson as a limit to the binomial, but as a random variable that stands on its own.)

Tests of significance and the theory of estimation occupy the remainder of the book, the former in two sections with the latter between. A chapter explains the χ^2 test of goodness of fit and gives several examples. A second chapter explains tests of significance for parameters and does an excellent expository job in dividing the topic into (1) tests based on standard errors (i.e., tests using the normal distribution as the appropriate distribution) and (2) tests based on exact distributions, such for example as Student's t. The last section on tests of significance gives a brief exposition of the general theory of testing statistical hypotheses (emphasizing the Neyman-Pearson theory) and two short chapters, one on variance analysis (following Fisher) and one on regression problems. The section on the theory of estimation begins with Fisher's criteria of efficient and sufficient estimates, continues with a discussion of (1) the method of moments, (2) method of maximum likelihood, and (3) χ^2 minimum method, and finishes with a final chapter on confidence regions.

The factual listing of contents of this book is not sufficient to give an indication of its character. The organization of the material is a magnificently successful job and is one of the reasons why the book will be for some time to come, in this writer's judgment, the outstanding expository treatise on the subject. The whole logical process is built up step by step from the statement of the first axiom of the mathematical theory to the last example illustrating an application. In all this process the author's grasp of the literature which has preceded him is nothing short of amazing. It would seem that not an article has been left out and, far more important, not one has failed of analysis and of placement in its proper historical setting in the development of modern statistical theory. The author admits omission of some topics he had originally intended to treat, and it will be evident to any careful reader that space limitations exacted their toll, particularly in the way of illustrations and applications. That leaves the book as an exposition of basic theory and gives all necessary leeway to the able student and teacher of statistics to supplement, illustrate, and apply. Thus the book should make the teaching of modern statistical theory easier from now on, and therefore better. The book is a milestone in progress.

BRUCE D. MUDGETT
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GREGORY, CHARLES O. *Labor and the Law.* Pp. 467. New York: W. W. Norton & Co., 1946. $5.00.

In his first book for the general reader, Professor Charles O. Gregory of the University of Chicago Law School traces the development of American labor law, with emphasis on United States Supreme Court interpretations of the common law and Federal statutes. Beginning with the early criminal conspiracy doctrine, Gregory treats the successive legal doctrines affecting union organization, collective bargaining, strikes, picketing, and boycotts, dealing at length with the more important decisions in which the Supreme Court has interpreted the Sherman and Clayton Acts, the Norris-La Guardia Act, and the National Labor Relations Act. While its simple, nontechnical language and clear style will attract the layman, the book's depth of understanding and penetrating analysis will commend it to the specialist.

Professor Gregory insists that the law regulating union activities should be written by the legislatures, not by the courts. He is as critical of the conservative Supreme Court of the past for invalidating progressive social legislation of Congress or the states as he is of the present liberal Court for holding unconstitutional recent state measures regulating picketing or otherwise restricting the self-help activities of unions. His own view is that unions have acquired too much economic power, that the Supreme Court in recent years has gone too far in conferring upon them immunity under the Sherman Act and in surrounding their techniques of economic coercion with constitutional immunity.

Professor Gregory proposes a number of changes in the law of labor relations. Some, like his proposal that Congress establish a procedure for arbitration of differences arising under collective agreements, are designed to strengthen the process of collective bargaining. Others flow from his belief that the power of unions should be restricted. Like Thurman W. Arnold, he would outlaw union economic pressure to prevent the use of cheaper material, improved equipment, or more efficient methods, as he would hold illegal union efforts to enforce illegally fixed prices or to compel the hiring of unnecessary labor. In addition, he would declare illegal a union embargo on equipment made elsewhere or a union effort to drive an employing establishment out of business by refusing to deal with it. To help protect the processes of the National Labor Relations Act he would outlaw picketing by a union losing an election, a boycott in defiance of a Board certification, or a refusal to handle or install material produced by a company bargaining with another union. In the interests of union members he would regulate union finances and protect individual employment rights. In the cases of utilities or industries and services vital to public health or safety, he suggests some sort of compulsory settlement of bargaining disputes. In other cases he would protect the ultimate right to strike, though he suggests that Congress might require strikes to be deferred while machinery to settle disputes were utilized.

At a time when changes in our labor legislation are so often urged in a spirit of narrow partisanship, it is refreshing to read Professor Gregory's dispassionate analysis, whether or not one agrees with each of his suggestions. Even those who object to most of his proposed changes should agree that his clear and readable volume represents an important contribution to the general literature on labor law.

JOEL SEIDMAN
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SMITH, CHARLES COPELAND. *The Foreman's Place in Management.* Pp. xi, 159. New York: Harper & Brothers, 1946. $2.00.

The rise of foremen's unions, according to Mr. Smith, is attributable to the failure of American business owners to give adequate heed to the legitimate complaints of foremen. They should be paid higher salaries. A meaningful differential should be established between their compensation and that of the men they supervise. A fair but flexible seniority system should be established for foremen, supplemented by an adequate pension plan. A conference method should be evolved, to afford foremen an opportunity to participate in company policy. Smith has for many years represented the National Association of Manufacturers as a speaker on labor-management relations. His style of writing is simple, direct, and interesting.

Smith does not like foremen's unions. He compares the background and objectives of the Foremen's Association of America with those of the National Association of Foremen from this point of view. The former, which believes in collective bargaining and strikes, is labeled antimanagement, whereas words of praise are used to describe the latter, which opposes collective bargaining and derives financial support from various companies. Though not precisely analogous, to be sure, the argument that foremen's unions are antimanagement would seem to be at least comparable to the view formerly held that collective bargaining is incompatible with free enterprise. Because of its limited purpose, the book does not reach the problem of reconciling foremen's unions with the preservation of essential management functions.

American management would do well to take to heart the sound proposals for improving its personnel relations with supervisory employees. Smith's suggestions are relevant under both individual and collective bargaining. Foremen are, as he says, merchants of ideas on behalf of the preservation of the system of free enterprise, and their leadership status might well be used for this purpose by wise management.

LUDWIG TELLER

New York City

PATTERSON, WILLIAM F., and M. H. HEDGES. *Educating for Industry*. Pp. ix, 229. New York: Prentice-Hall, Inc., 1946. $2.50.

This book meets a genuine need in the literature on American education. Many volumes have been written on all levels of education and a number of significant books have appeared in the general field of vocational education; but this is almost the only recent publication devoted exclusively to a description of one of the oldest but least-known educational programs—the apprenticeship system. It does more than describe the policies and procedures of apprenticeship. It emphasizes the unity of the educational process and disparages the unfortunate dichotomy often drawn between general and vocational education; and it shows the role of the apprenticeship system in the national educational program. As the authors point out, "The present wide acceptance of apprenticeship training in industry and universal recognition of its importance throughout the United States is a promise that in the future the young man can expect not only a liberal education that fits him to live but also the opportunity for a training that fits him to work and earn a living, thus making available the greatest boon of democracy, the equality of opportunity."

After preliminary chapters which concisely summarize the development and the importance of apprentice training, the following factors are discussed: management's and labor's stake in apprenticeship; how apprenticeship operates to procure control, integration, and co-operation; the relative role of the local industry, the state agencies, and the Federal Government; the nature of related instruction; and the occupations suited to apprenticeship. The last three chapters appraise the effect of World War II and present a forward view regarding the role of apprentice training, granted a constructive program in public relations, in reconversion, and in national production.

An extensive, well-classified bibliography is given, as well as extremely useful appendices: the roster of the national committees; the acts of Congress authorizing the establishment of the national apprenticeship system; an illustration of state legislation; a sample job-training analysis; the list of apprenticeable trades; the relation of apprentice training to Public Laws 16 and 346 providing training and education for veterans; and an example of the way the National Committee functions.

In these days of strikes and of tension between management and labor the authors' contribution is very much more than a description of apprenticeship. It illustrates that co-operation can be achieved when the end product—in this case the training of young workers—is kept as the focal point for joint planning.

FRANCIS J. BROWN

American Council on Education

BROWN, FRANCIS J. *Educational Opportunities for Veterans.* Pp. 142. Washington: Public Affairs Press, 1946. $2.00.

CHAMBERS, M. M. *Opinions on Gains for American Education From Wartime Armed Services Training.* Pp. vii, 78. Washington: American Council on Education, 1946. 50¢.

These publications cover aspects of two recent episodes in American educational history which will have far-reaching effects on the future development of schools and colleges in this country. For four years young men, and some young women, were withdrawn from the normal pursuit of education and vocation to prepare for a vast array of specialized roles in our huge war machine of World War II.

We are now taxing the country's nonmilitary educational institutions to the utmost in the process of recognizing our obligation to these young people, now veterans, by providing for them educational opportunities sought in readjusting to civilian life.

Chambers shows that the features of wartime armed service training were: use of visual aids, directness of aims, "learning by performance," elimination of nonessential content, frequent testing, good discipline, small classes and individual work, and good in-service teacher training and supervision. From surveys of educators who were in the Service and of veterans who are now students in school or college, he finds opinion favoring the adaptation of these practices to civilian schools and colleges. Civilian schools have much to learn from the experiences of service schools despite the differences between them as to purpose, student motivation, curriculum content, and extent of financial support.

The Brown publication deals with a chapter not yet closed. At this writing, there are over 2,000,000 students enrolled in higher educational institutions alone. This is approximately 50 per cent more than were enrolled for any previous year. Almost half of the current college enrollment consists of veterans attending school under the benefits of the GI Bill of Rights, Public Law 346, or the Vocational Rehabilitation Act, Public Law 16. Brown describes provisions of this legislation under the significant heading, "fifteen million scholarships."

In describing educational opportunities (for veterans) in colleges and universities, in schools of less than college grade, and in training on the job, Brown points out many of the difficulties which have arisen to harass Federal agencies, the states, local communities, and veterans themselves. There have been serious problems in connection with approving institutions, providing adequate physical facilities and instructional personnel, establishing policies for entrance, maintaining proper balance between service to veterans and service to nonveteran students, and avoiding what "may develop into America's number one racket."

Although programs of education for veterans are changing so rapidly that any publication soon becomes out of date, the Brown publication is thorough and comprehensive, and should serve as an adequate single volume of introduction to this very important epic in American education.

FRANCIS G. CORNELL

Federal Security Agency

BENEDEK, THERESE. *Insight and Personality Adjustment.* Pp. xi, 307. New York: Ronald Press Co., 1946. $4.00.

There are five parts to this treatise, which manages sooner or later to mention pretty nearly every personal adjustment problem of our time. (1) Forty pages outline the psychoanalytic concept of the development of the individual to maturation and then discuss the dynamics of the interpersonal relationships of marriage. (2) Sixty pages list all the possible problems of the soldier—in relation both to the Army and to the various members of his family at home. It is a big wing, and so hurried a glance at each specimen in it leads to dizziness. (3) One hundred and forty pages similarly run through all the things that could be the relationships, the yearnings, the frustrations, and the adjustments of each of those left at home. (4) Then sixty pages are an interesting, if rather dogmatic, discussion of the psychosexual problems that have developed for men and women from the breakdown of the patriarchal family. If the reader will constantly remind himself through this section that "this is one of the ways one might look at it," this is stimulating reading. Except for the novice, I cannot feel that there are new things here—though the language of the psychoanalyst would make it appear so. At least there isn't this awful feeling of breathless hurry in these pages. (5) Then six pages tell us that the atomic bomb has challenged us to an entirely new level of questions and preoccupations. "Psychosexual" is made to seem very small in this postscript. I do not suppose that Dr. Benedek meant it so, but the reader cannot help wondering why he read the previous three hundred pages. These last few pages are rather sonorously written, but are far and away the best part of the volume; here is the only place where the author says "let's find out" instead of "I'll tell you."

The main thesis of the book is that each thing that happens to each person goes on reverberating through all subsequent events. This point—and its corollary that each individual reacts in his own idiomatic way to any event—is of extreme importance, but it could have been clearly said in much less space. Two hundred pages of proving the point by listing the permutations and combinations of interpersonal relationships confuse rather than illustrate.

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CURTI, MERLE. *The Roots of American Loyalty.* Pp. x, 267. New York: Columbia University Press, 1946. $3.00.

In discoursing of the roots of American loyalty Mr. Curti is more concerned to expound the various and conflicting ideas, interests, and objects that diverse Americans have called Americanism and either given, or demanded from others, devotion to, than to lay bare the disposition of the will, the inner act of faith, in which a loyalty consists. Thus, he is not discussing roots so much as soils, not attitudes so much as objects of attitudes. Such objects have a center or nucleus, and a fringe or context, a figure and a ground. The center at different times in the Nation's history has been, and often still is, a state and its government, a dominant cult, a geographical region, an economic interest (such as that of the southern slave-owner or the northern factory-owner, the western farmer or the eastern industrial worker), a political party seeking control of the government, and so on to no end. The fringe or context or ground is the rest of the country, regarded as valuable or meaningful in the degree that it sustains and nourishes or can be made to sustain and nourish the central interest. But the differentia of "true," or "100%," Americanism, or genuine patriotism, is always held to be devotion to this central interest.

In many ways such diverse interests overlap and reinforce each other; in some they may be altogether irreconcilable. Obbligato across them all runs what might be called the American Idea. This is the religion of democracy as formally set down in the Declaration of Independence and variously restated and supplemented by political leaders, poets, and ministers of religion throughout history. There is a line, for which the formulations of Jefferson, Emerson, Whitman, Lincoln, and Wilson provide the trajectory, along which are ranged all sorts and conditions of men, including a Catholic prelate and a chaplain of the Sons of the American Revolution. That line constitutes the definition of the over-all American Idea and the American way—the faith and the way, in the words of the aforesaid chaplain, for "all classes and conditions of men, all nationalities, races and colors to live together in unity."

In developing his argument Mr. Curti has used the method he has made familiar in the *Growth of American Thought*. His survey via letters, journals, orations, and major expressions of the idea of America traces them from the national beginnings to the present, and sets them more or less in the context of both the chronic and the acute problems of the national life. He concludes that we are headed for "the more integral, exclusive and chauvinistic type" of "American patriotism." The record of recent years does not seem to me to point that way.

H. M. KALLEN
New School for Social Research

OKUBO, MINÉ. *Citizen 13660.* Pp. 209. New York: Columbia University Press, 1946. $2.75.

The nights and days that followed Sunday, December 7, 1941 were nights and days of consternation on the Pacific coast. "Pearl Harbor Bombed" was followed by widespread rumors of "attacks" and "probable invasion" via Lower California; then that frightful night of February 25, 1942 when powerful searchlights, crisscrossing the sky, and "rumbling, roaring gunfire frantically sought to counter 'objects in the sky' "; then every person of German, Italian, and Japanese origin became a lurking enemy; after that, arrests and curfew for some; and for 110,000 Japanese two-thirds of whom were native-born Americans, forced evacuation.

The story of that exodus has been told by several observers. Here it is told by one who herself went through the pangs of it all. The account is simple, eloquent, poignant, in pen-and-ink drawings and in a narrative that is restrained, lightly humorous, and yet vivid. Suddenly snatched away from home and friends, the "Father . . . whisked away to an internment camp," the family name reduced to the mere number 13660, along with the rest, the author and her brother join the trek to the stables of a race track, then to the wilds, the winds, and the sandstorms of a desert—just particles of human dust! Four decades of "yellow peril" propaganda had borne bitter, bitter fruit and made an inerasable stain on man's escutcheon.

The book is not wholly accurate. The author refers to "friends" who came to see the "evacuees" on the way, to give them sandwiches, and so forth, but "Caucasians" look on the evacuees with disdain (p. 12), MP's are austere if not brutal (p. 18), and the long-barreled gun dominates the scene at every turn (pp. 18, 19, 26, 27, 29). As a matter of fact, and to their lasting credit, Americans who showed sympathy, who were moved to indignation, to tears, almost to revolt, far outnumbered those who gloated over the whole affair of the evacuation. And in the camps there were United States officials who were considerate, as well as those who were not. The book does not show this.

So simple are these pages, so direct and matter of fact, so meaningful, that only a creative mind could have conceived them and taken the pains to put them into lasting form. Had the artist-author, without blinking at reality, depicted also the total sorrow of "the other half," her book would have been great art.

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MERIAM, LEWIS. *Relief and Social Security.* Pp. xx, 912. Washington, D. C.: The Brookings Institution, 1946. $5.00.

This book provides a greatly needed assembly of the facts about the various relief and social security measures launched by our Federal Government within recent years. To such a rehearsal, exhaustively presented, the author adds his comment on the incongruities now existing in structure and functioning, with his appraisal of the steps needed to produce a workable program for the Nation to pursue.

That our present social security law is but half-baked is easily demonstrated in Part I of this work. Pretending to establish an insurance plan, we have in effect set up a system of relief without proof of need.

Dr. Meriam's work is tiresomely but justifiably complete. As a standard of comparison illuminating the discussion, he presents the English "no-means" system and the New Zealand "means-test" program, and goes into detail as to their cost, comparing them with our own plan. For social workers, who are too prone to forget that public welfare services must be paid for, the mounting costs of our no-means-test program must seem appalling. Even to the politician who would promise everything today and let future generations pay the bills, it must give pause.

Some sterling fundamentals of success in a democracy are revoiced and emphasized in the text; as, for instance, that responsibility for dependency in the individual rests first on himself, second on his blood kin, and third on society. The workers and producers of today should support the dependents of today. Again, a program of social security is one of two things: either it is a scheme to redistribute the wealth of the people, or it is a plan for the relief of persons in need. Our system pretends to be the latter. In fact it belongs to the former.

Dr. Meriam's conclusion is that our system of social security should be developed on a basis of need, with a means test, somewhat after the manner of the New Zealand plan, and made universal in coverage. Its administration should be spread between Federal and state governments on a grants-in-aid basis.

The layman should speak gently when venturing to suggest reading to the Congress. Nevertheless, here is a book on a vital subject of legislation that every member of the Congress should read and ponder. It is authoritative, thoroughly objective, wholly free from the odor of propaganda.

ROBERT W. KELSO

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STRODE, JOSEPHINE (Ed.). *Social Insight Through Short Stories.* Pp. xi, 285. New York: Harper & Brothers, 1946. $3.00.

What gives me considerable pause, as I think of *Social Insight Through Short Stories* being used in classes in economics, sociology, guidance, education, and psychology (Miss Strode's intention for it), is my uncertainty about the personal and social philosophy, as well as the background of reliable information in certain areas of some of the instructors who will be using it. That perusal of the volume will constitute a "pleasurable experience," I do not doubt. The stories are well written and deal with people and situations provocative of both feeling and thought. But toward what conclusions will class members be drawn through discussion of material which portrays public assistance recipients as improvident, lazy, and irresponsible (Ruby and Camelia); an unemployed young man as "ungrateful" for whatever largesse an employer is inclined to dispense regardless of established rates of pay for the work done (Metropolitan Incident); social workers as physically repulsive snoopers discharging responsibilities (badly) which apparently they have no business taking on at all (Unfit); medical scientists as basing their findings on erroneous facts whose accuracy they take no pains to ensure (What You Don't Know Won't Hurt You)? Biases and lack of understanding on the part of several of the authors in relation to certain "kinds of people" are obvious. How will instructors use such exposition of prejudice and ignorance—recognize them for what they are? Or is it possible that any considerable number may share some or all of them?

Every story *could* be used to deepen feeling for fellow human beings, to broaden understanding, to set in motion critical thinking about human and social problems and programs. But many could also be used to deepen existing prejudice and to spread *mis*understanding—already all too prevalent.

"Because the use of short stories as a teaching aid is widespread and teachers generally have developed their own methods, no suggestions for such use are proffered and no questions are added which might mar reader enjoyment of the stories," writes Miss Strode in her Preface. What we must appreciate is that these stories were not collected for the purpose of "reader enjoyment" but for the purpose of developing social insight. If a social worker takes responsibility for assembling material for this social purpose, may she not have a further responsibility to do what she can to ensure that a positive social purpose is realized—perhaps through indicating areas of ignorance and bias, illustrated by some modern writers, and their potential danger to the development of an informed public opinion on matters of great social concern. Certainly several of the stories are a "bad press" for social workers (and not one is a "good press" for them); a bad press for recipients of public assistance, unemployed persons, persons of foreign extraction; and a terrible press for smug John Citizen who tries so terribly hard to be so terribly kind to persons he despises (Ruby and Camelia, Unfit, The Ladies Call on Mr. Pusik, The Cave Dwellers, Metropolitan Incident).

Those stories which are limited to being excellent stories by sensitive and deeply human writers (Ferber, Glaspell, Maugham, West, Withenden, Munro, and Saroyan) could hardly be misused, because of something in the authors' fundamental relationships to and feeling for the people of whom they write. Certain other of the authors seem to have taken cheap jibes at people and professions they neither understand nor like—either to get a laugh or to give vent to irritation that all of human nature does not conform to their own seemingly self-satisfied notions of themselves.

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WILLIAMS, ROGER J. *The Human Frontier: A New Pathway for Science Toward a Better Understanding of Ourselves.* Pp. ix, 314. New York: Harcourt, Brace, and Co., 1946. $3.00.

If Biochemist Williams had restricted himself to a summary of the contributions of biochemistry to a knowledge of individual differences, without speculation, the book would have been useful. But Williams sets about describing something he calls "humanics." This is the "science of human beings (which has for its purpose improvement in social control). . . . Only by learning its basic truths, teaching them to our youth, and by extending greatly the boundaries of our knowledge can we cope with numerous social problems: education, marriage, health, employment, charlatanism in politics and elsewhere, crime, alcoholism, group bigotry (whose name is legion), and war." It is too bad that spots of middle-class Liberalism in the book will protect it from many well-merited barbs on the ground of a flimsy expediency derived from there being so few Liberals or liberals among physical and biological scientists. In my estimation, however, such a work should be judged solely in terms of scientific criteria.

In developing his "humanics" theme, Williams gives his brand of biochemical or vitamin determinism the oversimplications typical of biological determinists, plus a few of his own. Racial strains or otherwise derived heritable factors account for a vast range and detail of human behavior patterns. Practically no suggestion is given that he is acquainted with the significance of situational, interpersonal, and cultural factors in personality development and in societal movements and events. "Our opinions and attitudes," he asserts, "are determined to a considerable extent by our mental abilities and traits and by the functioning of our sensory reactions and our autonomic nervous system." Elsewhere he notes that psychological traits are "discrete psychological characteristics that are of social importance" and can best be understood by using "an extensive study of physiological traits . . . as a starting point."

As if this were not enough, Williams seeks further glory for his "humanics" by demanding that it be regarded as a system of ethics rendered mandatory by the Authority of Science. He says it is an "ally of morality and religion."

To develop "humanics," Williams calls for "the aid and co-operation of those of every discipline," but he does not expect much from the social scientists. The anthropologists, he says, deal with skulls, and social psychology "is variable and its scope too restricted for a broad scientific study of man."

If this book were to be judged solely on its merits as an alleged contribution to science, it could be ignored as an uninformed bit of meddling. Unfortunately it will be regarded by many physical and biological (so-called "natural") scientists as an adequate report on the shortcomings of social science and of the ways in which those shortcomings may be met.

ALFRED MCCLUNG LEE
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BRUNNER, EMIL. *Justice and the Social Order.* Pp. vi, 304. New York: Harper & Brothers, 1945. $3 00.

This book, like Plato's *Republic,* is a systematic inquiry into the nature of justice and its application to the social order.

It differs from the classic in being much more clearly outlined and also in depending, for its point of departure, on the Bible and the theology of the great Reformers.

The book deserves a wider reading than theological circles will afford it. For while it will make the most sense to a critical Protestant, it contains much which no student of political science can afford to ignore. Its clarity and logical progression from concept to concept place it with the all-too-few great works which succeed in integrating, at least in part, wide areas of human intellectual endeavor.

Social scientists will forgive the relatively few indications of ignorance of or disdain for their empirical findings: "Any normally conditioned human being knows perfectly well what is the right structure of the family and what is a reversal of roles." "The steady increase in divorce has its main source in this individualistic conception of marriage, though many people may not be fully aware of the fact." Admirers of Plato will gag at the statement that Aristotle was the first to inquire into the nature of justice. Nor will any great intellectual furor be caused by the following, from one of the weaker parts of the section on the economic order: "the employers must listen to what the workers have to say and the workers to what the employers have to say. This listening to each other is the concrete expression of mutual recognition as members of a community." Dr. Brunner's conception of "community," incidentally, has much in common with Toennies', and it is unfortunate that the possibilities for social theory which both he and Toennies derive from the distinction between *Gemeinschaft* and *Gesellschaft* are not more deliberately exploited in their relation to theory of justice.

Such points of negative criticism should not be allowed to distort the general high level of clarification and exposition which this book achieves. Particularly fruitful, for example, is the systematic exploration of the *suum cuique*, "the rendering to each man of his due," as the core of justice. The development of the relationship of justice to the Christian concept of love (*agape*) is not only beautifully handled but full of ethical implication: "There can be no such thing as a law which discriminates in favor of the individual, which is entirely fitted to the individual, which would admit as valid the uniqueness of the individual, for that would invalidate the very conception of law. . . . Love can only do more, it can never do less, than justice requires. A citizen who falsifies his income-tax return in order to practice charity cannot appeal to love in exculpation; love of that kind is sheer sentimentality."

The conception of static and dynamic justice is particularly important to theologians interested in questioning the applicability of specific Biblical injunctions to contemporary society. It has, however, a definite bearing on the secular problem of perfectionism versus expediency: "there are two kinds of justice. Firstly, that which 'is in itself just' is based on the divinely created nature of man and presupposes it; it is the absolute justice of the order of creation. Secondly, there is relative justice, which is just in reference to a reality which has fallen away from the order of creation. . . . In the system of positive law, relative justice is superior to absolute justice because absolute justice would, from the outset, be no more than a fiction, a lie, and an outrage on life." It is in this connection that the author analyzes idealistic socialism as being possible in small experimental communities, but as embracing totalitarian compulsives when it is enforced on a whole populace. The ideal is contaminated when it becomes institutionalized. This is about as close as one could expect a European theologian to come to John Dewey's dictum that the "end" includes the "means."

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INDEX

Acton (Lord), 175
Adams, Henry, 146
Adamson, E., quoted, 64
Agassiz, Louis, 120
Agriculture as affected by technology, 28–29, 112, 125, 154
ANDERSON, GAYLORD W., The Political Impact of Modern Science on Public Health, 126–134
Andrews, Roy Chapman, 28
Anzilotti, Dionisio, quoted, 43
Aristotle, 160, 173
Atomic bomb
  a triumph of free research, 15–17
  changed the world's attitude toward war, 9, 18
  co-operation in development of, 17–19
  lessons of development of, 18–19
  methods of making, 6
  military control
    a threat to civil liberty, 54, 58–60
    as affecting development of bomb, 16–17
  no counter force available, 34, 42
  political implications of, 42, 73–74
  program of development of, 11–15
  See also Atomic energy; Atomic Energy Act; Energy
ATOMIC CRUSADE AND ITS SOCIAL IMPLICATIONS, THE, Arthur H. Compton, 9–19
ATOMIC DILEMMA, THE, Bernard Brodie, 32–41
Atomic energy
  control of atomic energy
    American proposal for, 36, 38–39
      compared with Soviet proposal, 49–50
      details of, 47–48
      obstacles to, 39–41
      Soviet Union's attitude toward, 39–41
    Carnegie Endowment's proposal for, 52
    international supervision, 38, 89, 93
      circumstances favoring, 47
    outlawing of atomic bomb, 37–38
    Soviet Union's proposal for, 49
      compared with American proposal, 49–50
      motives underlying, 51
    vested in Atomic Energy Commission, 90–96
  effects of Army control of, 16–17, 54, 58–60
  menace of, exceeds benefits, 33
  peacetime uses of, 7, 10, 33
    provided for in Atomic Energy Act, 93–95
  responsibility of social science regarding, 143–144
  scientists' view of, 9–11, 33
  See also Atomic bomb; Atomic Energy Act; Energy
Atomic Energy Act
  juristic features of, 95–97
  provisions of, 90–95
Attlee, Clement, 89
Atwater, Wilbur O., 119; cited, 120

Bard, Ralph A., 15
Barnard, Chester I., 47
Baruch, Bernard M., 36, 39, 47, 89
  quoted, 48, 53, 72
Bavelas, Alex, cited, 79
Becker, Carl L., 43; quoted, 135
Bergson, Henri, 163
Bernal, J. W., 172
Bethe, H. A., 3
Beveridge, William H., cited, 158
Black, Hugo L., 56
Bliven, Bruce, 65
Boudreau, Frank G., quoted, 123
Bourget, Charles Joseph Paul, quoted, 176
Brahe, Tycho, 160
Bridges, Harry, 62
BRIGGS, HERBERT W., World Government and the Control of Atomic Energy, 42–53
BRODIE, BERNARD, The Atomic Dilemma, 32–41
Brodie, Bernard, cited, 51; editor, 38
BROMAGE, ARTHUR W., Total War and the Preservation of Democracy, 66–74
Broun, Heywood, 62
Bryce, James, 67, 68, 72; cited, 66
Bush, Vannevar, 12, 13, 14, 15, 144
Byrnes, James F., 15

Chittenden, Russell H., 119
CIVIL LIBERTIES IN THE ATOMIC AGE, Robert E. Cushman, 54–65
Clayton, William L., 15
Committee on Un-American Activities
  a menace to freedom, 63–65
  views and methods of, 60–63
Communications
  communication skills, importance of, 138
  Soviet Union's restriction of, 109–110
COMPTON, ARTHUR H., The Atomic Crusade and Its Social Implications, 9–19
Compton, Arthur H., 15
Compton, Karl T., 15
Conant, James Bryant, 12, 13, 14, 15
Copernicus, Nicolaus, 160
CRANE, H. R., Recent Advance in the Physical Sciences, 1–8
Cummings, Richard O., cited, 119; quoted, 120
CUSHMAN, ROBERT E., Civil Liberties in the Atomic Age, 54–65

Davis, William H., 95
Death rate, decline of in United States and India, 114–115
Democracy
  in Germany, destruction of, 68–71
  in United States
    preservation of, in atomic warfare, 72–73
    progress of, since 1888, 66–68
  local self-government essential to, 71–72
  threatened by governmental expansion, 98
  would not characterize world government, 45
De Witt, John L., 56; quoted, 57
Dies, Martin, 61, 62, 63, 65
Disraeli, Benjamin, 126
Dulles, John Foster, cited, 42
Dunn, Frederick S., cited, 51

Economic security
  and freedom, 152–153, 158–159
  demand for, 105, 152–153
  depends on government planning, 156–158
Education, secondary, needs of.
  curriculum contents, 137–140
  plant facilities, 136–137
  rural high schools, problem of, 135–136
  scholarships and fellowships, 137
  teachers and teaching methods, 140–141
Einstein, Albert, 65
Eisenhower, Dwight D., 61
Employment
  prerequisites for full employment, 22–23
Energy
  exploitation of, 2
  nuclear reactions, 2–3, 4, 5–6
  production of, by the sun, 3, 5
  sources of, 1–2
    future, 7–8
  See also Atomic bomb; Atomic energy; Atomic Energy Act
Euclid, 169
Evatt, Herbert V., 34

Fénelon, François, quoted, 173
Fermi, Enrico, 15
Finletter, Thomas K., quoted, 45, 46
Food and nutrition
  diet in United States
    changes in, 121–122
    efforts to improve, 123–125
    inadequacy of, 122–123
  scientific views of, 119–121, 124
  standards of nutrition, 124
  wartime experience in (U. S.), 123
Foster, Michael, cited, 119
Fox, William T. R., cited, 38
Francis of Assisi, 174
Franco, Francisco, 61
Frankfurter, Felix, 65
Franklin, Benjamin, 144
Freedom
  and economic security, 152–153, 158–159
  demand for, 152
  See also Liberty, civil; Scientific research

Galileo, 160
Gephart, F. C., cited, 121, 125
Goebbels, Paul Joseph, 173
GOOD, EVIL, AND BEYOND, George N. Shuster, 169–176
Government
  local
    in United States
      preparation of, for total war, 72–73
      progress in, since 1888, 66–68
    local self-government indispensable to democracy, 71–72, 74
    wartime functioning of, in Germany, 68–71
  quality of, as affecting population growth, 113–114
  responsibility of
    for economic welfare, 156–158
    for public health, 128–130, 157
  United States, decentralization of in preparation for war, 72–73
Gromyko, Andrei A., 36, 40, 41, 49
Grotius, Hugo, 36
Groves, Leslie R., 13, 14, 15, 16

HABER, WILLIAM, Security, Freedom, and Modern Technology, 152–159
Harrison, George L., 14
Hart, Liddell, 36
Health, *see* Public health service
Henderson, Leon, 62
Hershey, Lewis B., 123
Hertz, Richard, cited, 169
Hitler, Adolf, 61, 65, 71, 167
Holmes, Oliver Wendell, 172; quoted, 43
Hoover, Herbert, 122
Hopkins, Harry L., 65
Housing needs (U. S.), 156–157
HOW TECHNOLOGY CHANGES SOCIETY, William Fielding Ogburn, 81–88
Humanities
  distinctive features of, 161–162, 167
  fine arts
    functions of, 163–166
    importance of, in secondary education, 139
  function of, 168
  philosophy, 162–163
    confusion in, 169–170
    of Nietzsche and of Marx, 170–171
    problem of justice, 172–174
    totalitarian, 171–174
  religion, 166–167, 175
HUMANITIES IN A SCIENTIFIC WORLD, THE, Hayward Keniston, 160–168
Hutchins, Robert M., 35

Ickes, Harold L., 65
IMPACT OF SCIENCE ON POPULATION GROWTH, THE, Warren S. Thompson, 111–118
Industrial civilization
  basic factors in, 20
    labor, 25–26
    technology, 26–27
  characterized by mechanical power, 1
  industrial location seeks bituminous coal, 20–22
Industrial production
  as a factor in social change, 81–82
  as affected by science, 99–100, 154
International control
  of atomic energy, 36, 38–41, 47–50
  past and existing forms of, 50
International organization
  depends on popular support, 75
International trade, world competition for, 30–31

Jackson, Robert H., 172
James, William, 151
Japanese-Americans, wartime evacuation of, 56–57
Jay, John, quoted, 35
Jeans, Philip C., quoted, 124
Jefferson, Thomas, 144

Keats, John, 41
KENISTON, HAYWARD, The Humanities in a Scientific World, 160–168
Kepler, Johannes, 160
Keynes, John M., 36
King, W. L. Mackenzie, 89
Koestler, Arthur, 172

Labor
  as a factor in industrialization, 25–26
  dependent on an expanding economy, 103, 106
  increased productivity of, 99
  occupational shift in, 101, 154
  position of, in the economy, 106
Labor unions, potentialities of, 106
La Guardia, Fiorello H., 67
Langworthy, Charles F, 120; cited, 121
Laplace, Pierre Simon de, 119
Lavoisier, Antoine Laurent, 119
LAW AND ATOMIC ENERGY, E. Blythe Stason, 89–98
Lawrence, Ernest O, 12, 15
Legislation
  proposed, in support of scientific research, 144–145
  See also Atomic Energy Act
LEWIS, HOWARD B., Nutrition, 119–125
Lewis, W. K., 13
Liberty, civil
  menaced by Committee on Un-American Activities, 60, 63–65
  menaced by military control of atomic bomb, 54, 58–60
  violated by military government in Hawaii, 57–58
  violated by wartime evacuation of Japanese-Americans, 56–57
  See also Freedom; Scientific research
Lieben, Fritz, cited, 119
Liebig, Justus von, 119
Lilienthal, David E., 36, 47
Lincoln, Abraham, 144
Living standards, *see* Standards of living
Lovett, Robert Morss, 65
Lusk, Graham, cited, 125; quoted, 121

McCollum, E. V., cited, 124
MacLeish, Archibald, 62
Macy, Icie G., cited, 123
Maier, N. R. F., cited, 79
Malthus, Thomas Robert, 28
MARQUIS, DONALD G., Psychology of Social Change, 75–80
Marshall, George C., 14, 15
Marx, Karl, 170, 171
May, Andrew J., 91
Mead, Margaret, cited, 79
Mendel, Lafayette B., cited, 120; quoted, 122
Merriam, Charles E, quoted, 53
Metzger, Delbert E., 57, 58
MEYERHOFF, HOWARD A., Some Social Implications of Natural Resources, 20–31
Milton, John, 32
Mitchell, Helen S, cited, 124
More, Thomas, 173
Morgan, Agnes Fay, cited, 124
Morley, John, quoted, 42
Moulton, Forest R., editor, 119
Mozart, Wolfgang A., 164
Mulder, Gerardus Johannes, 120
Murphy, Frank, 65; quoted, 57
Mussolini, Benito, 25, 71

Napoleon I, 36, 37
National sovereignty
  limitation of, 39–40
  vague conceptions of, 43
Nationalism an obstacle to world government, 35
Newman, John Henry, 172
Newton, Isaac, 160
Nichols, K. D., 13, 14
Niemeyer, Gerhart, quoted, 45
Nietzsche, Friedrich Wilhelm, 170, 171
NUTRITION, Howard B. Lewis, 119–125

OGBURN, WILLIAM FIELDING, How Technology Changes Society, 81–88

Oliver, Robert T., cited, 125
Oppenheimer, J. Robert, 15, 47
Orozco, José Clemente, 165
Orr, John, 123
Osler, William, 125

Palestrina, Giovanni, 164
Patterson, Robert P., 96
Paul (Saint), 173
Picasso, Pablo, 165
Pinchot, Gifford, 62
Planck, Max Karl E. L., 169
Planning
  for economic welfare, 156–158
  for scientific research, 108
Plato, 163, 169, 173
POLITICAL IMPACT OF MODERN SCIENCE ON PUBLIC HEALTH, THE, Gaylord W. Anderson, 126–134
Population
  dispersal of
    because of threat of war, 86–87
    because of transportation aids, 87
  growth
    as affected by government, 113–114
    as affected by science, 111
      in India, 115
      in Japan and colonial areas, 112–113
      through improved living standards, 111–112
    need for social control of, 117–118
    relative importance of factors in, 115–116
    social problems created by, 116–117
Power, mechanical
  characterizes technical civilization, 1
  See also Energy
Production, *see* Agriculture; Industrial production
Prokofiev, Sergei S., 164
PSYCHOLOGY OF SOCIAL CHANGE, Donald G. Marquis, 75–80
Public health service
  administration of, 132–134
  apathy toward, 126–127
  definition of, 127
  government responsibility for, 128–130, 157
  needed in public schools, 137–138
  objectives of, 127–128
  opposition to programs of, 128–129
  socialized medicine, 131
Public opinion
  determines effectiveness of international organization, 75
  study of, re collective security, 80
Purnell, William R., 13

Rankin, John E., 54, 58, 61, 65
Raw materials
  coal, location of, 20–21, 29
  determine industrialization, 20–22
  European policy regarding, 23–24
  in United States, depleted by war, 30
  production of, moves to low-cost areas, 24
RECENT ADVANCE IN THE PHYSICAL SCIENCES, H. R. Crane, 1–8
Religion, contribution of to human life, 166–167, 175
RESPONSIBILITY OF SOCIAL SCIENCE, Louis Wirth, 143–151
Richardson, Robert C., 57, 58
Rivera, Diego, 165
Rogers, Carl R., cited, 79
Roosevelt, Eleanor, 62
Roosevelt, Franklin D., 12, 13, 14, 61, 144

Samelson, B., cited, 77
Sanctorius, 119
Savonarola, Girolamo, 173
Schindler, Dietrich, cited, 44
Science
  as affecting
    agricultural production, 28–29, 112, 125
    behavior of the economy, 101–105, 155
    industrial production, 99–100
    public health service, 133, 134
    the economic structure, 100–101, 154
    the scientist, 174–175
    world population growth, 111–116
  character of, 160–161
  gap between natural and social sciences, 145–146, 149
  increased appreciation of, 8
  limitations of, 104–105, 155–156, 160–161, 167
  prestige of, 161
  relation of, to wisdom and morality, 109, 167
  social effects of, 105–108, 150, 155–156, 160
  social sciences
    and social problems, 149–151
    hostility toward, 145
      reasons for, 146–148
    importance of, in secondary education, 140
    planning by Social Science Research Council, 108
    responsibility of, 143–144, 149–151
    versus common sense, 147–148
  See also Scientific research; Technology
Scientific research
  financial support of, 8, 108–109
  freedom of research
    safeguarded by Atomic Energy Act, 91
    threatened by military control, 58–59
    value of, 15–17
  government support of, 144–145
  increased appreciation of, 8, 99
  planned guidance of, 108
  provided for in Atomic Energy Act, 91

- provided for in Declaration on Atomic Energy, 89
- *See also* Science

SECONDARY EDUCATION FOR A NEW WORLD, John W. Studebaker, 135–142
SECURITY, FREEDOM, AND MODERN TECHNOLOGY, William Haber, 152–159
SHUSTER, GEORGE N., Good, Evil, and Beyond, 169–176
Siqueiros, David Alfaro, 165
SLICHTER, SUMNER H., Some Economic Consequences of Science, 99–110
Smith, F. T., 77; cited, 78
Smith, Lillian, 62
Smyth, Henry D., 11; cited, 6, 33
Social change
- a slow process, 75–76, 156
- factors in, 77–79
- wrought by technology, 81–88

Social security
- expansion of, needed, 157
- *See also* Economic security

Socrates, 168, 174
SOME ECONOMIC CONSEQUENCES OF SCIENCE, Sumner H. Slichter, 99–110
SOME SOCIAL IMPLICATIONS OF NATURAL RESOURCES, Howard A Meyerhoff, 20–31
Sovereignty, *see* National sovereignty
Standards of living
- as affecting population growth, 111–112
- raised through technology, 154

STASON, E. BLYTHE, Law and Atomic Energy, 89–98
Steffens, Lincoln, 66
Stiebeling, Hazel K., cited, 123
Stimson, Henry L., 14
STUDEBAKER, JOHN W, Secondary Education for a New World, 135–142
Styer, W. D., 13

Tchaikovsky, Pëtr Ilich, 165
Technology
- as affecting industrial location, 27
- as affecting land use, 28–29, 112, 125
- changes society, 97–98, 150, 153
  - through large-scale consumption, 82–88
  - through mass production, 81–82
- complicates the legal system, 89
- in development and use of raw materials, 26–29
- leads to governmental expansion, 98
- what it has not done, 104–105
- *See also* Science

Theresa (Saint), 167
Thomas, Charles A., 13, 47
THOMPSON, WARREN S., The Impact of Science on Population Growth, 111–118
Tolman, R. C., 13
TOTAL WAR AND THE PRESERVATION OF DEMOCRACY, Arthur W. Bromage, 66–74
Treaties, relative value of, 51
Truman, Harry S., 14, 15, 61, 89

United Nations Charter
- effective date of, 42
- legal obligations embodied in, 52

Urey, Harold C., 12, 59

van Niel, Cornelis B., 169
Velázquez, Diego Rodríguez de Silva y, 165
Vermeer, Jan, 165
Viner, Jacob, 34; quoted, 35

Wallace, Henry A., 14, 33, 65
War
- disrupts civilian life, 68–71
- in Heaven, 32
- limitation of, 36–37
- not caused by poverty, 33

White, William Allen, 62
Wilder, Russell M., cited, 124; quoted, 123
Williams, Harold H., cited, 123
Williams, Robert R., cited, 124
Willkie, Wendell, quoted, 43
Wilson, Woodrow, 144
Winne, Harry A, 47
WIRTH, LOUIS, Responsibility of Social Science, 143–151
Wood, John S., 61, 62
Wooton, Barbara, cited, 152, 158
World government
- arguments against, 45–46
- establishment of, 44–45
- impracticability of, 33–35
- popular faith in, 42
- versus international government, 46–47

WORLD GOVERNMENT AND THE CONTROL OF ATOMIC ENERGY, Herbert W. Briggs, 42–53